HITACHI

SM00030

C24W410SN
C24W430N
C24W511TN
C28W410SN
C28W410TN
C28W411TN
C28W430N
C28W433N
C28W510SN
C28W510TN
C28W511NA
C32W1TN
C32W433N
C32W510SN
C32W511TN
C32WD2TN2
CL28W410TAN
CL32WD2TAN2
CP28W410TAN

SERVICE MANUAL
MANUEL D'ENTRETIEN
WARTUNGSHANDBUCH

CAUTION:
Before servicing this chassis, it is important that the service technician read the "Safety Precautions" and "Product Safety Notices" in this service manual.

ATTENTION:
Avant d'effectuer l'entretien du châassis, le technicien doit lire les «Précautions de sécurité» et les «Notices de sécurité du produit» présentés dans le présent manuel.

VORSICHT:
Vor Öffnen des Gehäuses hat der Service-Ingenieur die „Sicherheitshinweise" und „Hinweise zur Produktsicherheit" in diesem Wartungshandbuch zu lesen.

Data contained within this Service manual is subject to alteration for improvement.

Les données fournies dans le présent manuel d'entretien peuvent faire l'objet de modifications en vue de perfectionner le produit.

Die in diesem Wartungshandbuch enthaltenen Spezifikationen können sich zwecks Verbesserungen ändern.

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

Colour Television
December 2000

CIRCUIT DESCRIPTION

A7 PSU

From switch on the A.C. voltage is rectified by diodes D901 - D904, which produces approximately 300V across C905. This is then applied to the collector of Q903 via the primary winding of T900. Initially the voltage on pin 7 of IC900 will rise to approximately 16V via R901, D905 and Q905. This allows the internal circuitry of IC900 to generate a sawtooth waveform at pin 4, from which a squarewave output is obtained at pin 6. This output is applied to the gate of Q901 which turns on and off, this alters the voltage on the emitter of Q903 causing this device to turn on and off, generating the outputs in the secondary windings of T900.

After initial power up IC900 pin 7 is supplied from the bias winding (pin 4) of T900 via D911 for continued operation. The bias winding voltage is also rectified by D910 which is then supplied to the base of Q906 via R930. Q906 turns on and pulls the base of Q905 low via R930 turning Q905 off, this is done to reduce the power dissipated by R901 once the power supply is running.

A current sense circuit consisting of R910, R900, R922 and VR923 feeds back a voltage to pin 3 of IC900, this voltage is compared with an internal reference voltage ,of approximately 0.8V should the applied voltage exceed the reference the pulse width is limited from output pin 6. In this way Q903 is offered protection from changes in primary current.

R909 and C914 act as a soft start circuit, this limits the pulse width output from pin 6 during the initial start up period, allowing a gradual rise to full power.

Q907, Q908 and associated circuitry are for reducing the frequency of the power supply when the set is in standby.

A sense voltage rectified by D910 consisting of R908 and R906, supplies pin 2 of IC900, this is then compared to an internal reference voltage. If it exceeds the internal reference the output from pin 6 will be limited by the internal error amp. ZD970 will go short if the +B exceeds 180V.

The secondary voltage induced in T900 winding 14/16 is rectified by D950, producing the H.T. voltage which is smoothed by C977. In standby the H.T. rises slightly.

Winding 12/17 produces approximately 11V via D951, which is smoothed by C957. This is then applied to IC952 and Q957. IC952 is a +5V regulator which supplies the micro processor in both standby and normal running modes.

Q957 is used to switch, and regulate the +8V supply to the chassis, the output voltage being set by ZD957, D965, D966 and D967/J967A. The +8V is also used as the header supply for the +5V supply regulator IC951.

Winding 11/18 produces approximately 26V via D952, which is smoothed by C955 and then applied Q951 through R974, which is used as a current sense. The output from Q951 supplies +26V for the audio amplifier IC4000.

H.T. regulation is controlled by Q954 stage. The base of Q954 is set at a pre-determined level by the resistor network R950, VR950 and R953. The emitter of Q954 is held at approximately 6V2 by ZD950. Should the H.T. rise, the base voltage becomes more positive than the emitter, and this difference is amplified by the transistor and applied to opto-coupler IC901. The output from IC901 is then applied to pin 1 of IC900 which regulates the H.T. by altering the duty cycle of the waveform output from pin 6 of IC900.

STANDBY SWITCHING

The low voltage supplies are switched off in standby, this is controlled by the micro processor which outputs a high from pin 24 in standby and a low when the set is out of standby. This is then applied to resistors R948 and R982. This "high" is also applied to the base of Q950 via R982 which turns on, pulling the base of Q952 low, allowing Q951 to turn off, which removes the 26V to the audio section. When the set is out of standby the low applied to R982 is passed to the base of Q950 which turns off, allowing the base of Q952 to be pulled high via R993, Q952 in turn pulls the base of Q951 low through R992. Q951 will now supply the 26V audio (on Dolby models the 26V is also used as the header supply for the 18V regulator, IC953 which is provided to power the IR surround speaker transmitter via the phono socket at the rear of the set). The high applied to R948 is passed to the base of Q959 which turns on, pulling the base of Q957 low which turns off removing the chassis 8V supply. With the set out of standby the low applied to R948 is passed to the base of Q959 which turns off allowing the base of Q957 to rise via R986, Q957 then turns on supplying the regulated 8V.

POWER GOOD AND PROTECTION

IC950 is made up of 4 comparators, the power good line uses comparator 2 . Pin 5 is used as the reference which is held at 2.5V by IC954 supplied by pull up resistor R956. Pin 4 uses R961/R962 and R955/R959 as a potential divider which is connected between the +11V (C957) and T900 winding 12/17 through D959 which is in forward converter mode. In operation this means pin 4 is held below the reference level of pin 5 until the mains supply is interrupted or the set is switched off at which time pin 4 rises above pin 5 and the output pin 2 is pulled low. This low is applied to pin 60 of IC001 via R078. In normal operation pin 2 is held high by pull up resistor R957 from the 5V supply.

The protection line is held high under normal running conditions by R971 from the 5V supply, this high is applied to pin 22 of IC001. When the protection line is pulled low IC001 goes into standby mode, the set can be restarted by the usual methods of bringing the set out of standby, but until the cause of the protection circuit operation is remove the set will return to it's standby state.

The over current for the 26V audio supply uses comparator 1, a reference voltage is set up on pin 6 by resistors R967 and R964. The voltage being compared is fed to pin 7 using the potential divider R968 and R966 which is supplied from the output side of the current sense resistor R974. Should the voltage on pin 7 fall below that of pin 6 pin 1 will be pulled low and thus pulling the protection line low via D958 putting the set into standby.

Comparator 3 is used to protect against a layer short within the F.B.T. it will also act as protection for a short on the secondary outputs of the F.B.T. IC950 is supplied with approximately 26V via D960 to pin 3 from this supply a reference voltage is fed to pin 9 using potential divider R972/R969. Pin 8 is supplied by another potential divider this time made up of four resistors R973/R970 + R730 + R766. R730 + R766 sample the current flowing through Q751 should this increase the voltage drop across R730 + R766 will increase and raise the voltage of pin 8 when it exceeds pin 9 and pin 14 will be pulled low putting the set into standby.

Comparator 4 is used for EHT/over voltage protection, as all the F.B.T. secondary voltages are proportional the 200V supply to the CRT base is used to generate the voltage to be used in comparison, this is done by using a potential divider made up of R718, R749 and R719 on all but the 21" chassis this uses only R718 and R749, R719 is a link. ZD717 monitors the voltage at the junction of R718 and R749, if this exceeds 36V the Zener diode conducts applying a high on pin 10 of IC950 this is compared with the reference voltage on pin 11 which also uses the 2.5V set up by IC954. when pin 10 is higher than 2.5V pin 13 is pulled low in turn pulling the protection line low via D957 putting the set into standby.

The L.T. lines are given protection using diodes D962, D963, D969 and D972 these are connected in reverse bias from the protection line to the 18V, 8V, 5V and standby 5V

supplies respectively. Should any of the low voltage lines have a short circuit to ground the protection line will be pulled low causing the set to go into standby.

If the +B or audio supply lines become short circuit to ground before the protection on the secondary of the power supply, the primary over current protection (pin 3 IC900) will operate turning off the drive output from pin 6 IC900.

For models fitted with version 1.S software or later pins 45 and 46 of IC001 should be shorted together. This is for added protection using software. The horizontal pulse applied to pin 45 for OSD/TEXT positioning is sampled and measured by pin 46. The expected waveform will be a square wave with a maximum mark measurement of 20µs and a maximum space measurement of 100µs. If these maximums are exceeded the protection routine will activate.

DEFLECTION STAGES

IC501 generates the deflection output and control pulses.

HORIZONTAL

Pin 40 of IC501 is the horizontal drive output, this requires a pull up resistor to the 8V supply which is R551. The output is then applied to Q701 via R733, FB700 and R707/C736. The collector of Q701 is supplied from the +B via R701 and the primary winding of T702. The secondary of T702 drives the output transistor Q751, the collector of which is supplied from the +B via R735, R751, L700 and the primary of the FBT T701. The emitter of Q751 is connected to ground via R730 and R766 which are sense resistors and used for the protection circuit.

The capacitive divider network of C717 and C708 is used in conjunction with R724, R759, D713 and D714 to supply a line pulse with an amplitude of approximately 8V peak to peak. This pulse is applied to the micro processor IC001 pin 45 via Q005 and IC501 pin 41 via Q508 this is used for phase detection and to generate the sandcastle pulse used to synchronise the colour decoder, delay line and secam decoder.

VERTICAL

The vertical output amplifier IC601 requires a differential input to pins 1 and 2 this is supplied by IC501 from pins 46 and 47. IC601 pin 4 is supplied with 18V from IC602 which is used for general operation, pin 8 is supplied for the 200V rail via R621 and regulated by ZD603 it is also connected to the 27V rail via R617 to keep the voltage on pin 8 higher than pin 4 voltage during the flyback period on 21" models and purely from the 27V supply on all other models. The vertical scan output is between pins 9 and 3 of IC601. Pin 5 is the feedback control and is dependent on the value of resistors R602 and R603. Pin 10 supplies a frame frequency pulse to pin 22 of IC501 this is used for the vertical guard function. The vertical pulse required by the micro processor IC001 is derived from the vertical output via C603, R610 and R611 the resultant waveform is clamped by ZD602 .

EAST-WEST CORRECTION (WITHOUT IC603)

The picture geometry is controlled via the I2C bus, which is accessed by the menus in service mode. Pin 45 of IC501 outputs the parabolic waveform which is input to pin 12 of IC601, the amplified output from pin 11 this is connected to the centre of the diode modulator via R618 and L751. To stabilize the picture geometry during extremes of picture content brilliance the pin 4 output of T701(the abl) is fed back to pin 12 of IC601 via R764 and C744.

EAST-WEST CORRECTION (WITH IC603)

The picture geometry is controlled via the I2C bus, which is accessed by the menus in service mode. Pin 45 of IC501 outputs the parabolic waveform which is input to the gate of the MOSFET IC603 which is used to amplify the parabola. The drain is connected to R618 and the source is connected to ground. In this configuration J252 and J1 are removed which disconnect pins 11 and 12 of IC60. J246 and J247 are inserted connecting the MOSFET to the rest of the circuit.

Microprocessor and Related Circuits

The SAA5296/SAA5297 microprocessor (IC001) controls all the major functions of the television chassis.

The program code for the microprocessor is either stored within the microprocessor (SAA5297) or is stored in the M27C512 EPROM (IC002) (SAA5296).

The 74HCT573 latch (IC003) is used to interface the EPROM to the microprocessor. This device separates address lines A0-A7 from the microprocessor multiplexed address/data outputs AD0-AD7.

The 4016B analogue switch (IC004) is used to connect/disconnect the microprocessor I²C bus to the peripheral I²C bus and the scart I²C bus.

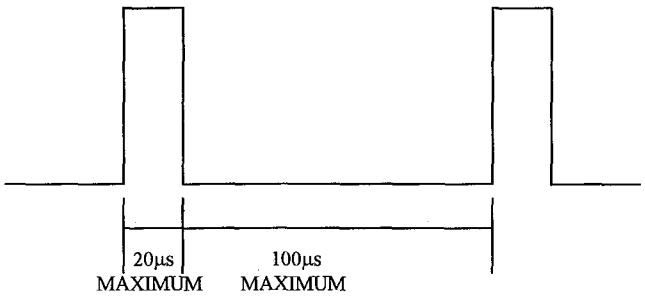
The ST24W16 EEPROM (IC005) is used to store all the TV (service and user) settings required by the microprocessor to control the TV. This device is connected to the microprocessor I²C bus. There is a separate write enable line controlled by the microprocessor to prevent inadvertent writes to the EEPROM. (Pin 67 of IC001).

Power on, standby and IR reception is indicated by the front panel LED. Either a LTL2114 (LED002) or a TLSH2101 (LED001) is fitted. The following table shows the various states of the LED:

LED State	Description
Off	TV switched off
On, dim	TV switched on, normal operation
On, dim, bright flash	TV switched on, normal operation, IR command received
On, bright	TV switched on, standby operation

The PIC-21043SP infra-red receiver (IR001) filters, demodulates and amplifies infra-red signals transmitted by the handset and sends them to the microprocessor for decoding and execution.

The 4-way or 5-way front panel switch (SW001) is connected via a resistor network to an ADC input on the microprocessor for command decoding and execution.



Protection Waveform
to Pin 46 IC001

IC001 SAA5296 Microprocessor Pin Definitions

Pin	Name	I/O	Level	Description
1	MUTE	O	OPEN LOW	Mute left and right audio amplifiers No mute
2	SAV.SW	I	HIGH LOW	SAV3 not connected SAV3 connected
3	KEYS	I	>4.2V 4.0-4.2V 3.3-3.7V 2.7-3.2V 1.3-1.8V 0.9-1.2V 0.7-0.8V <0.7V	No keys pressed MENU key pressed P+ key pressed P- key pressed V+ key pressed V- key pressed V+ and V- keys pressed N/A
4	N/C		0V	
5	AV1.SW	I	>3.1V 1.6-3.1V <1.6V	AV1 connected - 4:3 AV1 connected- 16:9 AV1 not connected
6	AV2.SW	I	>3.1V 1.6-3. IV <1.6V	AV2 connected - 4:3 AV2 connected - 16:9 AV2 not connected
7	AV3.ENA	O	OPEN LOW	AV3 enabled AV2 enabled
8	PANORAMIC	O	HIGH LOW	Panoramic function enabled Panoramic function disabled
9	COMPRESS	O	HIGH LOW	Compress function enabled Compress function disabled
10	N/C		X	
11	N/C		X	
12	V_{SSD}	I	0V	Digital ground
13	EA	I	HIGH LOW	Program memory internal (SAA 5297) Program memory external (SAA 5296)
14	N/C		0V	
15	N/C		0V	
16	N/C		0V	
17	PSEN	O	HIGH LOW	External program memory disable External program memory enable
18	ALE	O	HIGH LOW	External latch enable External latch disable
19	REF-	I	0V	ADC negative voltage reference
20	N/C		0V	
21	N/C		0V	
22	PROTECTION	I	HIGH LOW	PSU OK PSU FAIL
23	N/C		0V	
24	ON/OFF	O	HIGH LOW	PSU OFF PSU ON
25	LED.BRIGHT	O	OPEN LOW	LED DIM LED BRIGHT
26	EXTBLK	O	HIGH LOW	Blanking output for external RGB Normal picture
27	V_{SSA}	I	0V	Analogue ground
28	CVBS0	I	1V p-p	Composite video input for teletext decoding
29	N/C		0V	
30	BLACK	I	-	Video black level storage input
31	IREF	I		Reference current input for analogue circuits
32	A15	O	X	Address line 15 for external EPROM
33	A14	O	X	Address line 14 for external EPROM
34	A13	O	X	Address line 13 for external EPROM
35	A12	O	X	Address line 12 for external EPROM
36	N/C		X	
37	I.C.	I	0V	Digital ground
38	N/C		X	

Pin	Name	I/O	Level	Description
39	RGBREF	I	X	RGB output high level
40	B	O	X	BLUE OSD/text pixel output
41	G	O	X	GREEN OSD/text pixel output
42	R	O	X	RED OSD/text pixel output
43	EXTBLK	O	X	Fast blanking output for OSD/text
44	OSDBRI	O	X	PWM output to control OSD/text brightness
45	HSYNC	I	X	Horizontal sync input for OSD/text synchronisation
46	HSYNC	I	X	Horizontal sync input for OSD/text synchronisation
47	VSYNC	I	X	Vertical sync input for OSD/text synchronisation
48	VSYNC	I	X	Vertical sync input for OSD/text synchronisation
49	V_{DDA}	I	5V	Analogue supply
50	REF+	I	5V	ADC positive reference
51	V_{DDT}	I	5V	Teletext supply
52	A11	O	X	Address line 11 for external EPROM
53	A10	O	X	Address line 10 for external EPROM
54	A9	O	X	Address line 9 for external EPROM
55	A8	O	X	Address line 8 for external EPROM
56	OSCGND	O	0V	Crystal oscillator ground
57	XTALIN	I	X	12MHz crsytal oscillator input
58	XTALOUT	O	X	12MHz crsytal oscillator output
59	RESET	I	HIGH LOW	Reset microprocessor Normal operation
60	PWRGD	I	HIGH LOW	PSU OK PSU FAIL
61	INT.I²C.ENA	O	HIGH LOW	Enable peripheral I²C bus Disable peripheral I²C bus
62	V_{DDM}	I	5V	Microprocessor supply
63	RC	I	X	Remote control input
64	N/C		X	
65	MIC.SCL	I/O	X	Microprocessor I²C bus serial clock
66	MIC.SDA	I/O	X	Microprocessor I²C bus serial data
67	E²WE	O	HIGH LOW	EEPROM write disable EEPROM write enable
68	EXT.I²C.ENA	O	OPEN LOW	Disable scart I²C bus Enable scart I²C bus
69	AD0	I/O	X	Multiplexed address/data line 0 for external EEPROM
70	AD1	I/O	X	Multiplexed address/data line 1 for external EEPROM
71	AD2	I/O	X	Multiplexed address/data line 2 for external EEPROM
72	AD3	I/O	X	Multiplexed address/data line 3 for external EEPROM
73	AD4	I/O	X	Multiplexed address/data line 4 for external EEPROM
74	AD5	I/O	X	Multiplexed address/data line 5 for external EEPROM
75	AD6	I/O	X	Multiplexed address/data line 6 for external EEPROM
76	AD7	I/O	X	Multiplexed address/data line 7 for external EEPROM
77	VGA1	I/O	X	TBA
78	VGA2	I/O	X	TBA
79	VGA3	I/O	X	TBA
80	VGA4	I/O	X	TBA

IC002 27C512 EPROM Pin Definitions

Pin	Name	I/O	Level	Description
1	A15	I	X	Address line 15
2	A12	I	X	Address line 12
3	A7	I	X	Address line 7
4	A6	I	X	Address line 6
5	A5	I	X	Address line 5
6	A4	I	X	Address line 4
7	A3	I	X	Address line 3
8	A2	I	X	Address line 2
9	AI	I	X	Address line 1
10	A0	I	X	Address line 0
11	D0	O	X	Data line 0
12	D1	O	X	Data line 1
13	D2	O	X	Data line 2
14	V_{ss}	I	0V	Ground
15	D3	O	X	Data line 3
16	D4	O	X	Data line 4
17	D5	O	X	Data line 5
18	D6	O	X	Data line 6
19	D7	O	X	Data line 7
20	CE	I	HIGH LOW	EPROM in standby mode EPROM in operation mode
21	A10	I	X	Address line 10
22	OE	I	HIGH LOW	D0-D7 outputs high impedance D0-D7 outputs active
23	A11	I	X	Address line 11
24	A9	I	X	Address line 9
25	A8	I	X	Address line 8
26	A13	I	X	Address line 13
27	A14	I	X	Address line 14
28	V_{cc}	I	5V	Supply

IC003 74HCT573 Latch Pin Definitions

Pin	Name	I/O	Level	Description
1	OE	I	0V	Enable outputs A0-A7
2	AD0	I	X	Multiplexed address/data line 0 input
3	AD1	I	X	Multiplexed address/data line 1 input
4	AD2	I	X	Multiplexed address/data line 2 input
5	AD3	I	X	Multiplexed address/data line 3 input
6	AD4	I	X	Multiplexed address/data line 4 input
7	AD5	I	X	Multiplexed address/data line 5 input
8	AD6	I	X	Multiplexed address/data line 6 input
9	AD7	I	X	Multiplexed address/data line 7 input
10	GND	I	0V	Ground
11	LE	I	HIGH LOW	Latch AD0-AD7 inputs to A0-A7 outputs Maintain current A0-A7 output levels
12	A7	O	X	Address line 7 output
13	A6	O	X	Address line 6 outnut
14	A5	O	X	Address line 5 output
15	A4	O	X	Address line 4 output
16	A3	O	X	Address line 3 output
17	A2	O	X	Address line 2 output
18	A1	O	X	Address line 1 output
19	A0	O	X	Address line 0 output
20	V_{cc}	I	5V	Supply

IC004 4016B Analogue Switch Pin Definitions

Pin	Name	I/O	Level	Description
1	INT. SDA	I/O	X	Peripheral I²C bus SDA
2	MIC. SDA	I/O	X	Microprocessor I²C bus SDA
3	MIC.SDA	I/O	X	Microprocessor I²C bus SDA
4	EXT.SDA	I/O	X	Scart I²C bus SDA
5	EXT.SDA.ENA	I	HIGH LOW	Scart I²C bus SDA enable Scart I²C bus SDA disable
6	EXT.SCL.ENA	I	HIGH LOW	Scart I²C bus SCL enable Scart I²C bus SCL disable
7	GND	I	0V	Ground
8	EXT.SCL	I/O	X	Scart I²C bus SCL
9	MIC.SCL	I/O	X	Microprocessor I²C bus SCL
10	MIC.SCL	I/O	X	Microprocessor I²C bus SCL
11	INT.SCL	I/O	X	Peripheral I²C bus SCL
12	INT.SCL.ENA		HIGH LOW	Scart I²C bus SCL enable Scart I²C bus SCL disable
13	INT.SDA.ENA	I	HIGH LOW	Scart I²C bus SDA enable Scart I²C bus SDA disable
14	V_{cc}	I	5V	Supply

IC005 ST24W16 EEPROM Pin Definitions

Pin	Name	I/O	Level	Description
1	N/C		0V	
2	N/C		0V	
3	N/C		0V	
4	GND	I	0V	Ground
5	MIC.SDA	VO	X	Microprocessor I²C bus SDA
6	MIC.SCL	I/O	X	Microprocessor I²C bus SCL
7	E²WE	I	HIGH LOW	EEPROM write disable EEPROM write enable
8	V_{cc}	I	5V	Supply

IR001 PIC-21043SP Infra-Red Receiver Pin Definitions

Pin	Name	I/O	Level	Description
1	RC	O	X	Remote control data output
2	V_{cc}	I	5V	Supply
3	GND	I	0V	Ground

TUNER AND IF STAGES

The tuner used is powered from the chassis 5V and 33V supplies, it is controlled by the microprocessor IC001 via I²C bus commands . Pin 1 of the tuner is the AGC input and is connected to pin 54 of IC501 via R200 and R227, which is controlled by the I²C bus and adjusted in the "tuner" option in service mode. Pins 2 and 3 are not connected. Pin 4 is the SCL input. Pin 5 is the SDA input/output. Pin 6 is not connected. Pin 7 is the 5V for the tuner supplied via L200. Pin 8 is not connected. Pin 9 is the tuning voltage which is supplied from the 200V from T701 via R725 and R726 and stabilised by ZD200 and applied to pin 9 through R207. Pins 10 and 11 are the IF outputs which are fed to pins 1 and 2 of CP501 for the video path and pins 1 and 2 of CP202 for the FM audio path. The output from CP501 pins 4 and 5 are then input to IC501 pins 48 and 49, which demodulates the signal and supplies a composite video waveform from pin 6 which is applied to the base of Q500.

CP202 is a parallel sound saw filter, the output from pins 4 and 5 are applied to pins 1 and 2 of IC202. The signal is passed through an internal A.G.C. controlled 3 stage amplifier, to the detector stage of the IC. The A.G.C. stage characteristics are determined by the value of C221 connected to pin 19.

The signal is limited and phase shifted by the tuned circuit of L203 etc., connected to pins 16 and 17 this produces a reference signal used for intercarrier detection. The detected intercarrier (which supplies both FM mono and NICAM FM stereo) signal emerges from pin 7 and is then amplified by Q204. The signal is then applied to IC400 pin 12 for further processing.

CL MODELS ONLY

When used with a SECAM signal IC501 is switched for positive modulation via the I²C bus and is selected in the manual tuning option of the installation menu by choosing either L or L' . For NICAM sound CP202 and IC202 with associated components are used as described previously. For AM sound the output from pin 10 of the tuner is applied to the base of Q200 via R213 and C206 the DC bias on the base of Q200 is set by R212 and R216. Q200 amplifies the signal which is then fed to the base of Q201 via R210. Q201 is a buffer which makes the signal available to CP201.

Pin 9 of IC501 is a switched port controlled via the I²C bus, which is low when system L is selected and high when system L' is selected.

When system L is selected the low is applied to the base of Q203 is in turn allows the collector to stay high because of pull up resistor R218 which also makes the base of Q202 high pulling the collector and pin 1 of CP201 low, this allows the signal to pass from the emitter of Q201 through C207, D203, L201 and C209 before being applied to pin 2 of CP201.

When system L' is selected the high is applied to the base of Q203 which then pulls the base of Q202 low as well as the signal path to pin 2 of CP201. The collector of Q202 rises due to pull up resistor R217 and the signal from the emitter of Q201 passes through C207 and D202 to pin 1 of CP201.

The output from CP201 pins 4 and 5 are input to pins 1 and 16 of IC201 which is an AM demodulator. The AM audio pin is obtained for pin 6 which is fed via C411 to pin 29 of IC400 for further processing.

EXTERNAL VIDEO INPUT/OUTPUT

The majority of the video switching functions are carried out by IC501 which is controlled by the I²C bus.

The composite video at the emitter of Q500 is fed via R310 to pin 19 of E302 (scart 1) which is available for use by appropriately connected equipment. The signals being received by the tuner are output and independent of the picture displayed .

The composite video output from pin 38 is applied to the base of Q505 via R534, the emitter is connected to ground via R530. The collector is connected to the base of Q506 and also R533 which is a pull up to +8V. The emitter of Q506 is connected to the +8V supply. The collector is connected to R532 and R531 which is connected to the emitter of Q505 at the other end. This network doubles the signal level from 1V to 2V which is fed to pin 19 of E301 (scart 2). The signal from pin 38 IC501 is also applied to Q503 via R526, which is then applied to the micro processor IC001 pin 28 via C001, this is required for the teletext function.

The external video input applied to scart 1 pin 20 is fed to IC501 pin 17 via R115 and C521. Because of the limitations of the number of input ports to IC501 the composite video/ luminance input to scart 2 and the composite video/luminance input to AV3 (phono/SVHS sockets front of chassis) use a common input pin 11. AV2 signals are applied to Q304 via C320 and R335. R351 and R350 set the DC bias point. AV3 signals are applied to Q302 via C332 and R339 . R340 and R338 set the DC bias point, this is deliberately set so Q302 is turned on, the voltage across R337 and R352 keeps Q304 turned off as the emitter is not 0.6V lower than the base. The control of which signal is input is carried out by the micro processor IC001 pin 7, which pulls the base of Q302 low via D302 and R349, allowing the signal fed into AV2 to be processed by IC501.

NOTE

For chassis's fitted with the TDA8844 or TDA8843 type IC501, Q506 is deleted. The values of R531 and C539 altered and the sub panel containing the delay line and SECAM processing IC's is deleted.

EXTERNAL AUDIO INPUT/OUTPUT (56 series +non Dolby 16:9)

All the audio switching is performed within the IC400. The output from pin 47 is fed to E302 (scart 1) pin 1 via C312, R321 and L303. The output from pin 48 is fed to E302 pin 3 via C309 R320 and L302. These are the right and left RF (nicam/A2/mono) outputs respectively which are available to be connected to appropriate external equipment.

The output from pin 57 is fed to E301 (scart 2) pin 1 via C305, R307 and L301. The output from pin 58 is fed to E301 pin 3 via C303, R306 and L300. These are the monitor right and left outputs respectively which are available to be connected to appropriate external equipment.

The AV2 right input to E301 pin 2 is fed via C417 and R414 to pin 36 of IC400. The AV2 left input to E301 pin 6 is fed via C416 and R415 to pin 37 of IC400. The AV1 right input to E302 pin 2 is fed via C414 and R412 to pin 33 of IC400. The AV1 left input to E302 pin 6 is fed via C415 and R413 to pin 34 of IC400.

AV3 inputs applied to the phono sockets front of set fed through buffer stages C315, R326, Q300, C413 and R419 for the left and C316, R329, Q301, C412 and R418 for the right, to pins 32 and 31 of IC400 respectively.

(86 series + Dolby 16:9)

The output from IC 400 pin 47 is fed to E302 (scart 1) pin 1 via C312, R321 and L303. The output from pin 48 is fed to E302 pin 3 via C309, R320 and L302. These are the RF (nicam/A2/mono) right and left outputs respectively which are available to be connected to appropriate external equipment.

The output from pin 63 is fed to E301 (scart 2) pin 1 via E006, C305, R307 and L301. The output from pin 62 is fed to E301 pin 3 via E006, C303, R306 and L300, these are the monitor right and left outputs respectively which are available to be connected to appropriate external equipment.

The output from pin 57 is the surround channel which is supplied to an external amplifier via R4502, L4501, C4504 and E4500.

The output from pin 58 is the centre channel which is supplied to an external amplifier via R4501 , L4500, C4502 and E4500.

The right and left outputs from pins 60 and 61 of IC400 not only go to the on board amplifier but are also fed via R4503, L4502, C4506 and R4504, L4503, C4508 to E4500 for connection to an external amplifier.

The AV2 right input to E301 pin 2 is fed via C417 and R414 to pin 36 of IC400. The AV2 left input to E301 pin 6 is fed via C416 and R415 to pin 37 of IC400. The AV1 right input to E302 pin 2 is fed via C414 and R412 to pin 33 of IC400. The AV1 left input to E302 pin 6 is fed via C415 and R413 to pin 34 of IC400.

AV3 inputs applied to the phono sockets front of set fed through buffer stages C315, R326, Q300, C413 and R419 for the left and C316, R329, Q301, C412 and R418 for the right, to pins 32 and 31 of IC400 respectively.

AUDIO AMPLIFIER

The audio amplifier used on this chassis is the TDA7263M which is a double amplifier with one power supply pin 9. In this application it is used for left and right in all models (on the 86 series Dolby version the left and right can be fed via the phono outputs to an external amplifier).

The outputs from IC400 are applied to pins 1 and 5 of IC4000 via series resistors R4001 and R4002. The outputs are then taken from pins 8 and 10 passed through the DC blocking capacitors C4007 and C4011, the signals pass through E4000 the headphone socket which contains a switch, when no headphones are inserted the signal is applied to the speakers via PL4000. When headphones are inserted the internal speakers are disconnected and the signal passed through resistors R4014 and R4015 prior to being applied to the headphones which require a restricted power output.

Networks R4008/C4008 and R4011/C4010 are for stability whilst networks R4004/R4005/C4005 and R4007/R4009/C4006 are for the feedback control of the IC on pins 2 + 4.

A hardware mute is also employed on this model, this is carried out by pulling pin 3 low with Q4000 via R4006. Under normal working conditions pin 3 is at approximately half the supply voltage.

Q4000 is controlled by the micro processor IC001 via R001.

Dolby Pro-Logic Section

The Yamaha YSS241 is controlled by the Micro-processor via the I²C line (pin 52 & 53). The µ also controls the Reset from (pin 20 IC400 to pin 9 IC450)

The Dolby section uses four outputs from the TDA9875 - IC400

- Word select (WS)- Begins at pin 23 -IC400 to pin 2 of IC453 where it is inverted and emerges at pin 3 it then goes to pin 13 -IC450 -. This signal allows the separation between Left & Right.
- Master clock (SYSCLK) - Begins at pin 21 IC400 and then goes to pin 6 IC450 - This clock is for the Yamaha YSS241 (8.192 MHz).
- Bit Clock (SCK) - begins at pin 22 IC400 and then goes to pin 14 IC450 - for synchronising the I2S data.
- I2S R/L data (SD01) - begins at pin 25 IC400 and then goes to pin 12 IC450- Right/Left data input.

After Dolby processing there are 2 outputs returned to the TDA9875 via the shift registers.

- decoded Right and Left Signals (pin 41 IC450 Digital Format)
- Decoded Centre and surround (pin 40 IC450 Digital Format)
- A bit clock output is also supplied to the shift registers for synchronisation (pin 36 IC450)

PICTURE AND CONTROL ADJUSTMENTS

+B VOLTAGE ADJUSTMENT

(1) AC input voltage = 230V ± 5V/50Hz.

(2) Turn +B voltage VR (VR950) to mid-point (if pre-adjustment not done).

(3) Receive Philips circuit pattern. Switch on chassis and set the brightness and contrast to maximum.

(4) After applying heat run for 1 MIN. or more, turn VR950 gradually and adjust +B (re-check after 30 secs).

Measuring point: +B voltage C958 + side
gnd C958 – side

(5) Set the value of +B voltage to the value shown in the table below.

MODEL	+B VOLTAGE (V)
2156/86	110 V +/- 0.2V
2556/86	152 V +/- 0.2V
2856/86 (24/28WIWD)	152 V +/- 0.2V
32W/WD	149 V +/- 0.2V

AFC ALIGNMENT

(1) apply relevant RF signal. (a) CH40 UK (b) CH05 EXPORT

(2) on dual o/ multistandard receivers select BG standard.

(3) Enter frequency on CTV controls to ensure AFC loop is off.

(4) Select A.F.C. using service tuner option menu by pressing volume up or down buttons.

● Export

(1) Apply L' standard RF signal.

(2) Enter frequency on CTV controls.

(3) Select "L' I.F A.F.C." using service tuner option menu by pressing volume up or down buttons.

Sound AFC ALIGNMENT

To set L203 first the IF must be set as current A7 spec then:-

(1) Tune to appropriate channel for each model number (channel should have NICAM or A2 sound)

(2) Turn L203 clockwise until noise signal present on scope

(3) Turn L203 slowly anticlockwise until no noise appears on signal

(4) Then add a 180° turn in anticlockwise direction (a clean fixed signal must be seen)

(5) This point is now the set point

(6) To check correct set point has been achieved turn L203 through 180° first in anticlockwise direction checking for the fixed noise free signal then return to the set point. Next turn in a clockwise direction 180° checking for the fixed noise free signal then return to set point

(7) The signal should now be locked to constant tone

(8) Change channel to appropriate program +1 then back to appropriate program the NICAM symbol should appear (or tone signals for non nicam sets)

AGC ALIGNMENT

(1) With the signal received, apply heat run for more than two minutes to avoid the influence of circuit temperature drift.

(2) Connect a voltmeter of at least 100K internal resistance to the A.G.C. terminal of the tuner.

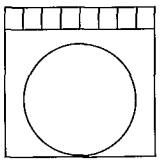
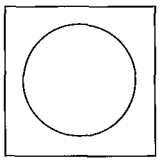
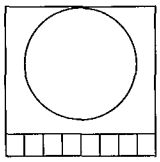
(3) Receive the channel below.

(4) Adjust A.G.C. using the service A.G.C. option in the menu until the following voltage is obtained.

Receive signal		Voltage setting	Setting
Freq	Level	(V)	
C40	+60dBuV	3.3+/-0. IV	UK
C40	+60dBuV	2.8+/- 0.1V	EXPORT 56
C40	+60dBuV	3+/-0.IV	EXPORT 86/ 16:9

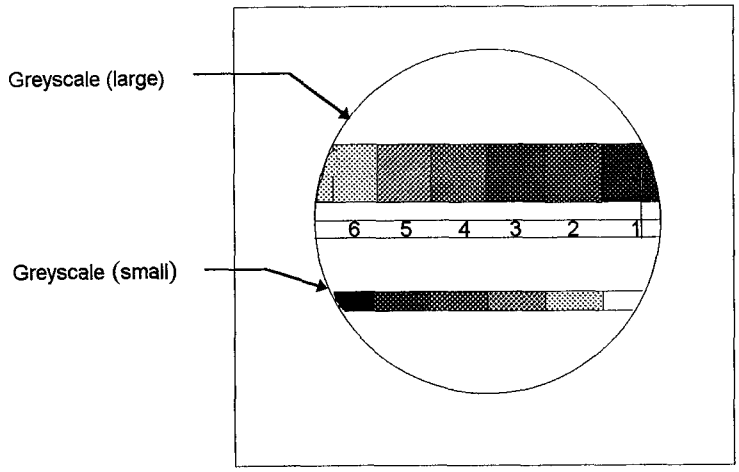
HORIZONTAL PHASE/VERTICAL CENTRE/VERTICAL AMPLITUDE

(1) Wait 5 minutes minimum after switching on the mains before adjustment.
(2) Receive the Philips circle pattern.
(3) Set brightness and contrast to maximum.
(4) The set should face North or South.
(5) AC input should be 230V ± 5V 50Hz.
(6) Adjust software control (using PC/HAND SET)
(7) Adjust control so that the centre of the picture is as in the diagram below.

	Upper: Extends Lower: Shrinks	Standard	Upper: Shrinks Lower: Extends
Picture Condition			
Size	Adjust until upper part of castillations disappear.	Adjust until both sides of castillations disappear.	Adjust until lower part of castillations disappear.

FOCUS ADJUSTMENT

(1) Receive the Philips circle pattern.
(2) Adjust after horizontal/vertical has been adjusted.
(3) Switch the received signal to the cross hatch signal.



(4) Turn the focus VR gradually clockwise from the full counter clockwise position so that the focus of the vertical line in the centre part, furthest to the right is adjusted for best result (contrast - maximum, brightness - normal).

CUT-OFF ADJUSTMENT (use 100/1 scope probe)

(1) Rough adjustment.
  (1.1) Set to video mode with no signal.
  (1.2) Turn screen pot of FBT until FBT lines disappear.
(2) Fine adjustment (56, 86 usingTDA8375*)
  (2.1) Change to AV mode no signal is required.
  (2.2) Connect probe to CRT green cathode.
  (2.3) Adjust screen pot until the following is achieved.

(3) Fine adjustment (16/9 set's and set's using TDA884*)

(3.1) Set cathode voltage to

84V (16/9 24" and 4/3 TDA884*) using service menu.

91V (16/9 32" and 16/9 28") using service menu.

(3.2) Change to AV mode no signal is required.

(3.3) Connect probe to CRT green cathode.

(3.4) Adjust screen pot until the following is achieved.

16/9 24" and 4/3 TDA884*
140 V +/- 1V Black

16/9 32" and 28"
150 V +/- 1V Black

WHITE BALANCE ADJUSTMENT

(1) Receive 30% white signal. (Or use generator through AV1, for improved signal)

(2) For 4/3 models High brightness: (set brightness level to > 2.5 cd/m^2)

For 16/9 models High brightness: (set brightness level to > 10 cd/m^2)

Adjust RGB gain of TDA8375 (or TDA8844) via I^2C, to give correct colour temp for country code.

PROTECTION CHECKS

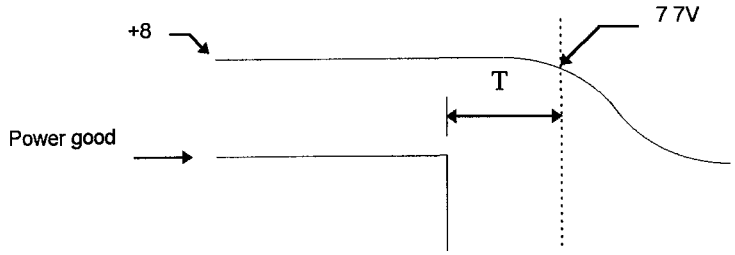
POWER GOOD LINE

(1) Set picture to same conditions as above.

(2) Measure pin 1 IC950. Should be HI, if LOW then cut R961.

If HI but no power down timing (see below) then cut R955 (if fitted).

(3) Check power down logic timing (>100mS).



PRIMARY CURRENT LIMIT

(1) In standby apply full load +40%, to the +B & audio rails (dynamic load)

(2) Adjust VR923 until set trips out.

(3) In standby apply full load, +B = 0.6A = 26V = 1.2A +18V (21 inch only) = 0.66A. PSU should not trip.

Loads (for trip)

28/25" +B = 150R +26V = 20R (Resistive)
32" +B = 140R +26V = 20R (Resistive)

21" +B = 170R +18 = 18R (Resistive)

ANODE/FOCUS SHORT-CIRCUIT CHECK

(1) Receive the circle pattern signal.

(2) Set the contrast/brightness to maximum.

(3) Check trip point by measuring voltage drop across R735 (0.7A - 1.2A)

(4) Or alternatively add dc voltage to R730/R766 until set trips. (The dc level should be equivalent to >1.5* (+B current peak value) 1.6 → 2.6 VDC SET **SHOULD** TRIP.

VOLTAGE MEASUREMENTS

IC001							
PIN	VOLTAGE	PIN	VOLTAGE	PIN	VOLTAGE	PIN	VOLTAGE
1	0V	21	0V	41**	0V	61	5V
2	5.1V	22	5.1V	42**	0V	62	5V
3	5V	23	0V	43*	0.11V	63	4.8V
4	0V	24	0.1V	44***	2.7V	64	5V
5	0V	25	3.3V	45*	1V	65*	5V
6	0V	26	0.25V	46	2.1	66*	5V
7	5V	27	0V	47	0.18V	67*	5V
8	0V	28	2.4V	48	0.18V	68	0V
9	0V	29	0V	49	5.1V	69*	2.2V
10	5V	30	2. 1V	50	5V	70*	2.6V
11	5V	31	2.5V	51	5.1V	71*	2.1V
12	0V	32*		52*	1.9V	72*	2V
13	0V	33*		53*	1.5V	73*	2.2V
14	0V	34*	1.4V	54*	3.1V	74*	2.7V
15	0V	35*	2.1V	55*	3.2V	75*	2.1V
16	0V	36	0V	56	0V	76*	2V
17*	2.5V	37	0V	57	2.4V	77	1.3V
18*	1.6V	38	1.4V	58	2.6V	78	1.6V
19	0V	39	2.1V	59	0V	79	1.2V
20	0V	40**	0V	60	5.1V	80	1.2V

* DIGITAL WAVEFORM 5V P.P
** DIGITAL WAVEFORM 2V P.P
*** DIGITAL WAVEFORM 4V P.P

IC002							
PIN	VOLTAGE	PIN	VOLTAGE	PIN	VOLTAGE	PIN	VOLTAGE
1	4.9V	9	2.5V	17	1.8V	25	0V
2	4.9V	10	2.6V	18	1.9V	26	2.2V
3	0V	11	2.1V	19	1.9V	27	2.6V
4	0V	12	2.3V	20	1.8V	28	0V
5	1.7V	13	1.6V	21	1.2V	29	0V
6	0.4V	14	1.5V	22	0V	30	4.9V
7	1.3V	15	1.5V	23	2.3V	31	4.9V
8	3.6V	16	0V	24	2.4V	32	4.9V

IC003							
PIN	VOLTAGE	PIN	VOLTAGE	PIN	VOLTAGE	PIN	VOLTAGE
1	0V	6*	2V	11****	1.65V	16*	2.6V
2*	1.9V	7*	2.2V	12*	2.8V	17*	2.7V
3*	2V	8*	2.2V	13*	2.5V	18*	3.1V
4*	2.7V	9*	2.4V	14*	2.2V	19*	2.3V
5*	1.6V	10	0V	15*	3.5V	20	5V

* DIGITAL WAVEFORM 5V P.P
**** DIGITAL WAVEFORM 5V P.P

IC004			
PIN	VOLTAGE	PIN	VOLTAGE
1	0V	8	0V
2	0V	9	0V
3	0V	10	0V
4	0V	11	0V
5	4.9V	12	4.9V
6	4.9V	13	4.9V
7	0V	14	4.9V

IC005			
PIN	VOLTAGE	PIN	VOLTAGE
1	0V	5	0V
2	0V	6	0V
3	0V	7	4.9V
4	0V	8	4.9V

IC201							
PIN	VOLTAGE	PIN	VOLTAGE	PIN	VOLTAGE	PIN	VOLTAGE
1	1.8V	5	1.9V	9	0V	13	0V
2	0V	6	1.9V	10	0V	14	7.8V
3	2.4V	7	0V	11	N/C	15	0V
4	4.3V	8	N/C	12	N/C	16	1.8V

IC202			
PIN	VOLTAGE	PIN	VOLTAGE
1	3.3V	11	2.6V
2	3.3V	12	2V
3	0.3V	13	1.9V
4	0.2V	14	1.9V
5	3.1V	15	6V
6	1.8V	16	2.8V
7	2.2V	17	2.8V
8	0.1	18	1V
9	1.9V	19	3V
10	1.5V	20	7.6V

IC400							
PIN	VOLTAGE	PIN	VOLTAGE	PIN	VOLTAGE	PIN	VOLTAGE
1	0V	17	2.4V	33	2.4V	49	0V
2	0V	18	3.5V	34	2.4V	50	0V
3	0V	19	3.5V	35	0V	51	2.4V
4	4.8V	20	4.8V	36	2.4V	52	2.4V
5	4.8V	21	1.5V	37	2.4V	53	2.4V
6	0V	22	4.8V	38	4.9V	54	2.4V
7	4.8V	23	4.8V	39	4.9V	55	2.4V
8	2.3V	24		40	0V	56	0V
9	4.9V	25	0V	41	2.4V	57	2.4V
10	2.3V	26	4.8V	42	1.7V	58	2.4V
11	2.4V	27	4.8V	43	0V	59	4.9V
12	2.4V	28	0V	44	2.5V	60	2.4V
13	0V	29	2.4V	45	2.5V	61	2.4V
14	0V	30	0V	46	2.5V	62	2.4V
15	4.8V	31	2.4V	47	2.4V	63	2.4V
16	4.8V	32	2.4V	48	2.4V	64	4.9V

IC501							
PIN	VOLTAGE	PIN	VOLTAGE	PIN	VOLTAGE	PIN	VOLTAGE
1	1.8V	15	3.1V	29	2.3V	43	3.9V
2	3.8V	16	0V	30	2.3V	44	0V
3	3.7V	17	3.4V	31	1.4V	45	2.7V
4	3.7V	18	7.7V	32	1.4V	46	2.2V
5	2.8V	19	2.8V	33	0.2V	47	2.2V
6	3.3V	20	2.7V	34	2.4V	48	4.5V
7	4.8V	21	2.7V	35	2.5V	49	4.5V
8	4.8V	22	2.6V	36	4.9V	50	1.9V
9	6.7V	23	0V	37	7.3V	51	3.7V
10	0.4V	24	3.7V	38	2.7V	52	3.9V
11	3.4V	25	3.7V	39	5V	53	3.9V
12	7.5V	26	0.1V	40	2.1V	54	4.4V
13	3.9V	27	0V	41	0.8V	55	2.9V
14	0V	28	2.8V	42	3.2V	56	3.6V

IC502 (ALL MODELS FITTED WITH TDA8375)							
PIN	VOLTAGE	PIN	VOLTAGE	PIN	VOLTAGE	PIN	VOLTAGE
1	4.5V	5	0.9V	9	4.5V	13	0V
2	0V	6	0V	10	0V	14	1.3V
3	0V	7	0.8V	11	2.9V	15	0V
4	0V	8	0V	12	2.9V	16	1.3V

IC503 (SECAM MODELS FITTED WITH TDA8375)							
PIN	VOLTAGE	PIN	VOLTAGE	PIN	VOLTAGE	PIN	VOLTAGE
1	1.6V	5	N/C	9	1.8V	13	N/C
2	1.1V	6	0V	10	1.8V	14	N/C
3	7.8V	7	3.3V	11	0V	15	0.93V
4	N/C	8	4.2V	12	N/C	16	3.5V

IC601			
PIN	VOLTAGE	PIN	VOLTAGE
1	2.4V	8	*
2	2.3V	9	8.8V
3	8.5V	10	2.2V
4	18.5V	11	0V
5	8.5V	12	2.6V
6	0V	13	0V
7	0V		

* 25"+28" models with a link fitted in R617/D604 position and R621 missing 27V. 21" and 16:9 models with D604 and R621 fitted 49V.

IC602		IC603 (16:9 models)	
PIN	VOLTAGE	PIN	VOLTAGE
INPUT	23V		
REF.	0V		
OUTPUT	18.1V		

IC900			
PIN	VOLTAGE	PIN	VOLTAGE
1	3.3V	5	0V
2	1.8V	6	1.9V
3	0.09V	7	12V
4	1.8V	8	5V

IC901			
PIN	VOLTAGE	PIN	VOLTAGE
1	120.4V	4	0V
2	120.4V	5	3.3V
3	0.5V	6	0.4V

IC950			
PIN	VOLTAGE	PIN	VOLTAGE
1	5.1V	8	3.2V
2	4.9V	9	4V
3	26.7V	10	0V
4	0.3V	11	2.4V
5	2.5V	12	0V
6	8.2V	13	5.2V
7	9V	14	4.9V

IC951		IC952		IC953		IC954	
PIN	VOLTAGE	PIN	VOLTAGE	PIN	VOLTAGE	PIN	VOLTAGE
INPUT	7.9V	INPUT	10.5V	INPUT	28V	OUTPUT	2.5V
REF.	0.23V	REF.	0V	REF.	0V	REF.	0V
OUTPUT	5.2V	OUTPUT	5V	OUTPUT	18V		

IC4000			
PIN	VOLTAGE	PIN	VOLTAGE
1	1.6V	7	0V
2	1.7V	8	13.8V
3	15V	9	0V
4	1.7V	10	2.4V
5	1.7V	11	0V
6	0V		

86 SERIES AND 16:9 DOLBY MODELS

IC450							
PIN	VOLTAGE	PIN	VOLTAGE	PIN	VOLTAGE	PIN	VOLTAGE
1	0V	17	5.1V	33	2.5V	49	5V
2*	2.5V	18	5V	34	2.5V	50	5V
3*	2.5V	19	5V	35*	2.5V	51	5V
4*	2.5V	20	5V	36*		52*	4.9V
5	0V	21	5V	37*	5V	53*	4.9V
6*****	2.5V	22	5V	38	1.2V	54	5.1V
7*	2.5V	23	5V	39	1.2V	55	5.1V
8	0V	24	5V	40*	1.3V	56	0V
9	5V	25	5V	41*	5.1V	57	0V
10	5.1V	26	5V	42*	5.1V	58	0V
11*	2.5V	27	5V	43	5.1V	59	0V
12*	1.4V	28	5V	44	5V	60	0V
13*	2.5V	29	5V	45	5.1V	61	0V
14*	2.5V	30	5V	46	5V	62*	5.1V
15	5V	31	5V	47	5V	63*	5.1V
16	5V	32	5V	48	5V	64	5.1V

* DIGITAL WAVEFORM 5V P.P.
***** DIGITAL WAVEFORM 6V P.P.

IC453			
PIN	VOLTAGE	PIN	VOLTAGE
1	5.1V	8	0V
2*	2.5V	9	5.1V
3*	2.5V	10	5.1V
4	0V	11*	2.5V
5	0V	12*	2.4V
6	5.1V	13	5.1V
7	0V	14	5.1V

* DIGITAL WAVEFORM 5V P.P.

IC454			
PIN	VOLTAGE	PIN	VOLTAGE
1*	2.1V	8*	1.3V
2	0V	9*	1.3V
3*	2.5V	10*	1.3V
4*	1.3V	11*	1.3V
5*	1.3V	12*	1.3V
6*	1.3V	13	1.3V
7	0V	14	5.1V

* DIGITAL WAVEFORM 5V P.P.

IC455			
PIN	VOLTAGE	PIN	VOLTAGE
1*	1.2V	8*	1.2V
2	0V	9*	1.2V
3*	2.5V	10*	1.2V
4*	1.2V	11*	1.2V
5*	1.2V	12*	1.2V
6*	1.2V	13*	1.2V
7	0V	14	5.1V

* DIGITAL WAVEFORM 5V P.P.

IC456 + IC457			
PIN	VOLTAGE	PIN	VOLTAGE
1	0V	8*	1.2V
2	0V	9	N/C
3*	2.5V	10*	1.2V
4*	1.2V	11*	1.2V
5*	1.2V	12*	1.2V
6*	1.2V	13	0V
7	0V	14	5.1V

* DIGITAL WAVEFORM 5V P.P.

CRN	B	C	E
Q1	2.7V	5.1V	2V
Q003	-0.25V	5.1V	0.2V
Q004	0.1V	5.1V	0.07V
Q005	1.4V	5.1V	0.98V
Q202*	0V	3.2V	0V
Q202**	3.2V	0V	0V
Q203*	4.4V	0V	0V
Q203**	0V	3.2V	0V
Q204	1.75V	0V	2.4V
Q304	2.5V	7.8V	4.2V
(1)Q4000	0.1V	15.2V	0V
Q500	3.2V	7.6V	2.6V
Q503	3.5V	7.8V	2.9V
Q505	3.5V	7.1V	2.9V
Q506	7.1V	5.7V	7.9V
Q508	1.7V	7.8V	1.6V
Q701	-0.98V	28.5V	-0.22V
(2)Q703	2.3V	18.1V	1.7V
(3)Q751	0.28V		0.3V
(4)Q801	7.8V	142V	7.3V
(4)Q802	7.8V	138V	7.3V
(4)Q803	7.8V	140V	7.3V
(4)Q804	137V	9V	135V
(4)Q805	139V	8.9V	137V
(4)Q806	142V	9V	140V
(4)Q811	3.3V	7.3V	2.5V
(4)Q812	3.3V	7.3V	2.7V
(4)Q813	3.3V	7.3V	2.6V
(4)Q814	138V	187V	137V
(4)Q815	136V	187V	135V
(4)Q816	141V	187V	139V

CRN	G	D	S
Q901	2.4V	10.4V	0.26V
CRN	B	C	E
Q902	2.5V	0V	0.02V
(5)Q903	10.1V		10.3V
Q905	4.5V	64V	12V
Q906	0.67V	0.08V	0V
Q907	0.02V	0.94V	0V
Q908	0.75V	0.02V	0V
Q950	0.32V	0.8V	0V
Q951	27.4V	28.2V	28V
Q952	0.8V	0.07V	0V
Q954	6.9V	119V	6.3V
Q957	8.6V	11.3V	7.9V
Q959	0.3V	8.5V	0V

* Measured in system L ** Measured in system L'

MEASUREMENTS MADE USING A FLUKE 77 MULTIMETER.

(1) When hardware mute activated by micro B=0.7V C=0V E=OV

(2) Dependent on picture content and customer control settings. Measurements made with contrast at maximum, brilliance and colour at mid position. Using a circle pattern signal.

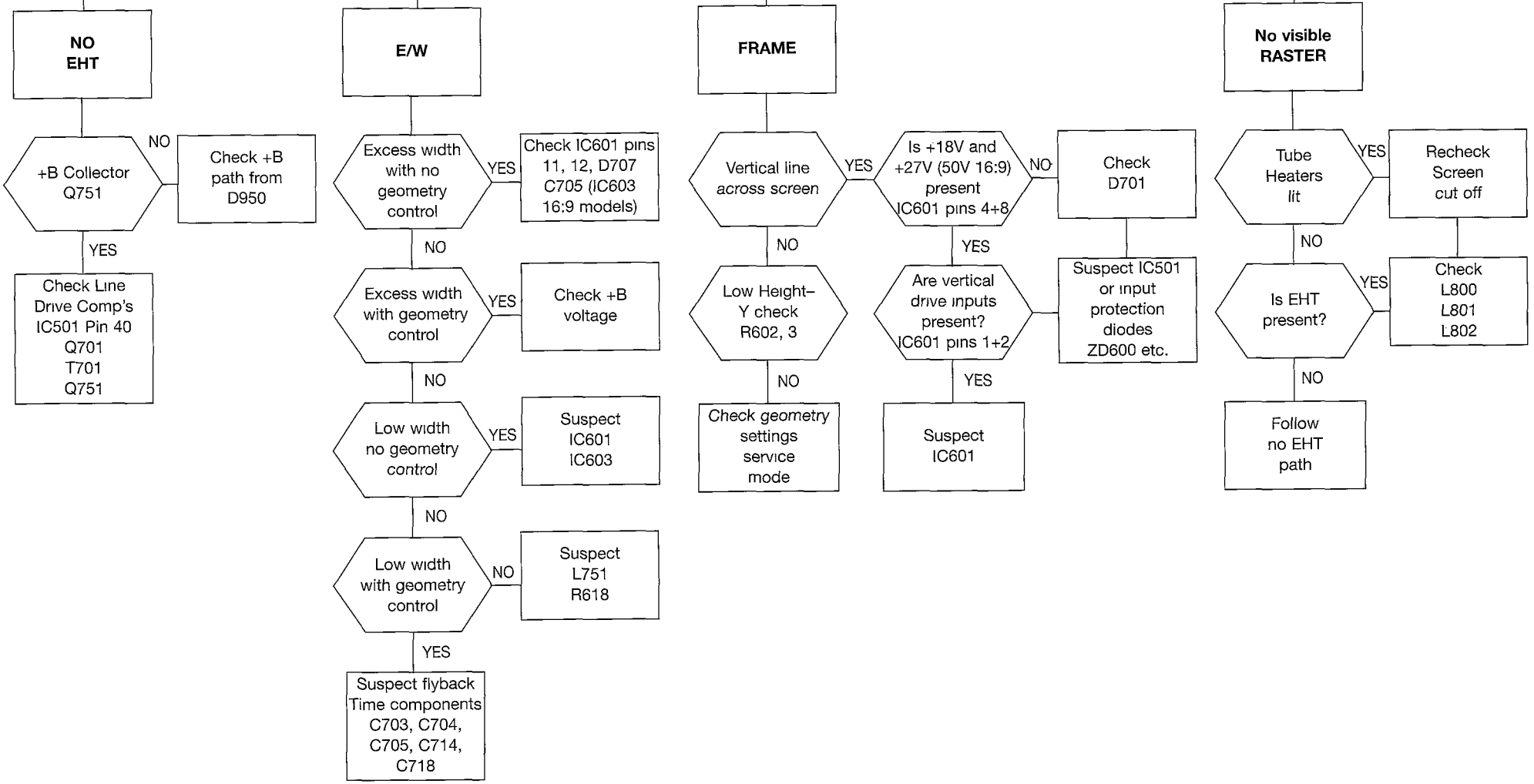
(3) Q751 collector waveform approximately 1200v pk.to pk.

(4) C.R.T. base transistor voltages dependent on picture content and customer control settings. Measurements made with contrast at maximum, brilliance and colour set to mid position. Using a circle pattern signal.

(5) Q903 collector waveform approximately 550v pk. to pk

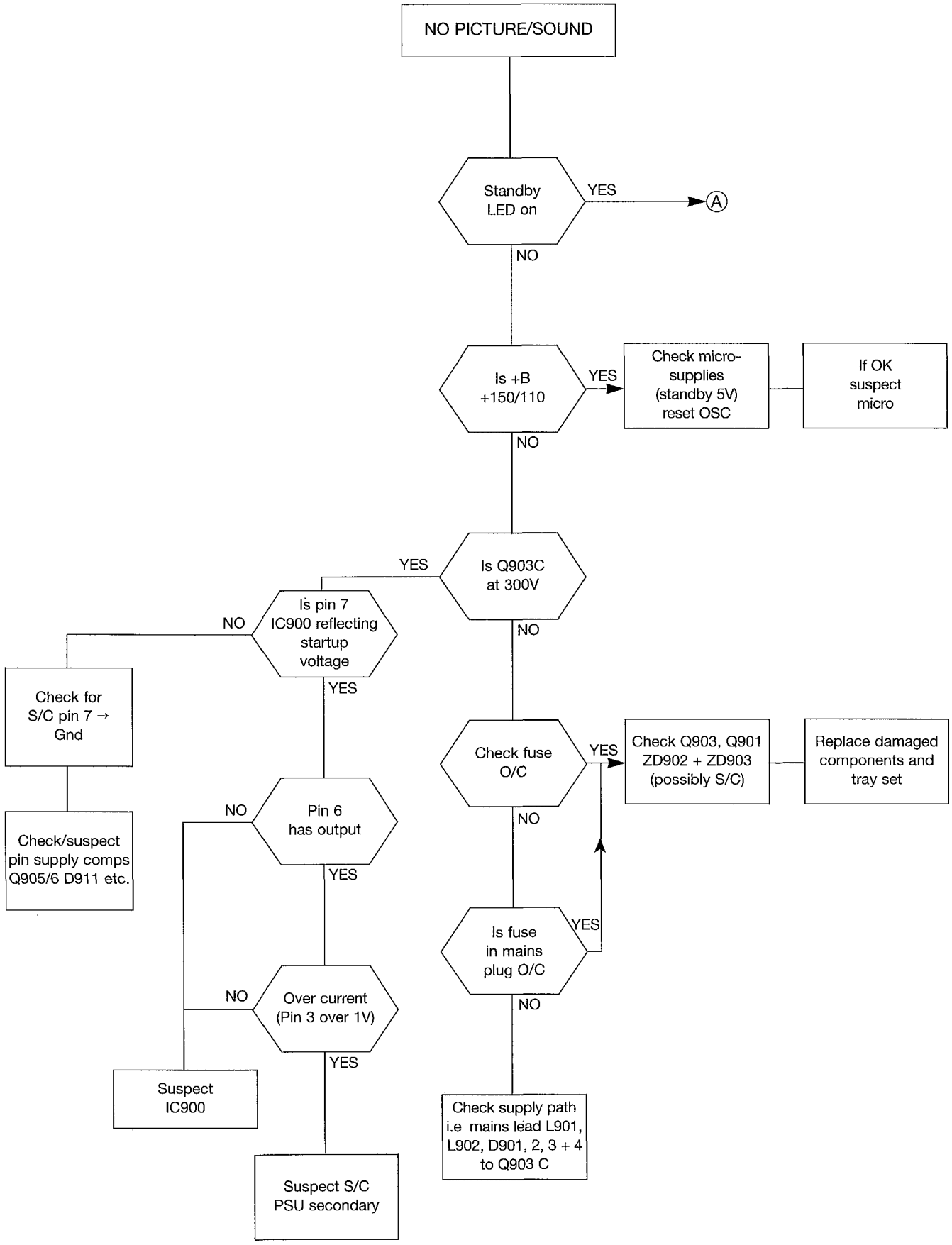
DIAGNOSTIC FLOW CHART

DEFLECTION FAULTS

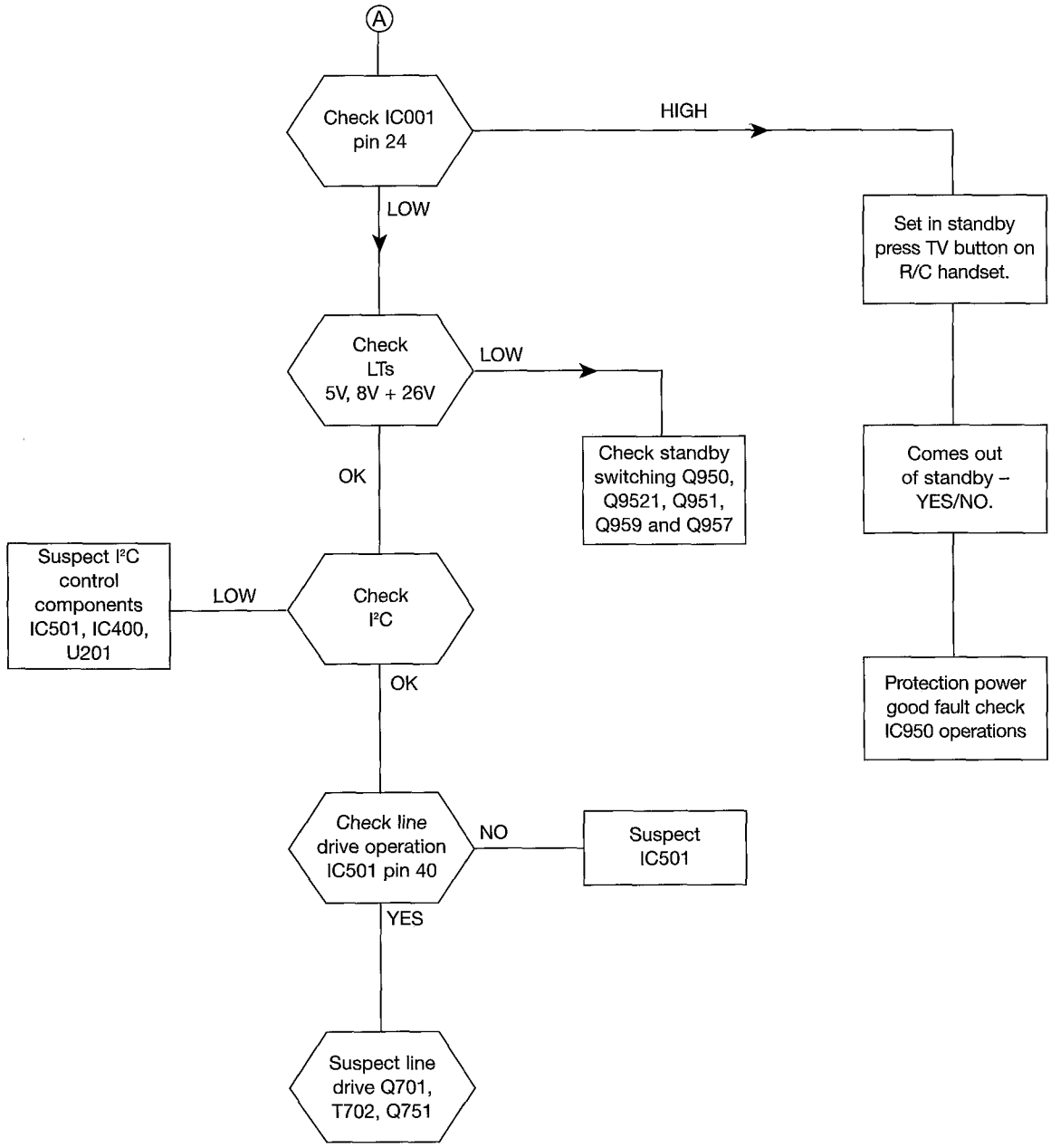


DIAGNOSTIC FLOW CHART

POWER SUPPLY

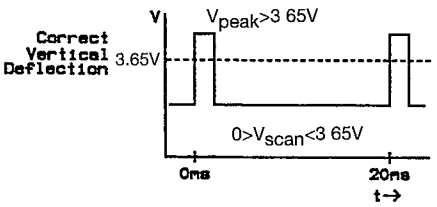


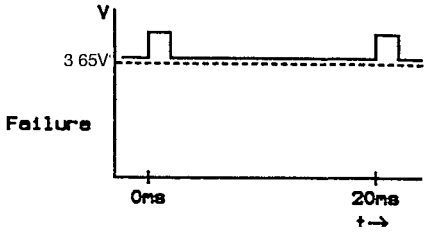
DIAGNOSTIC FLOW CHART

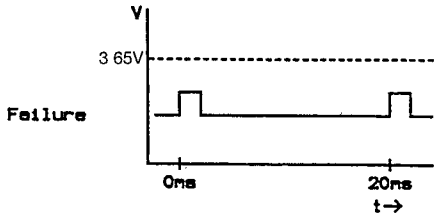


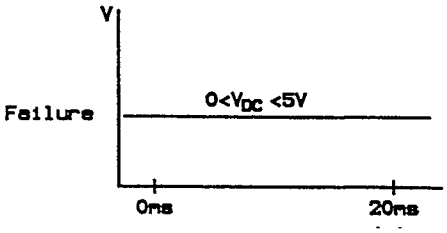
WAVEFORMS

Pin 22 of IC501
If IC501 sees any of the failure waveforms the screen will be blanked by IC501, although the O.S.D. will still be displayed

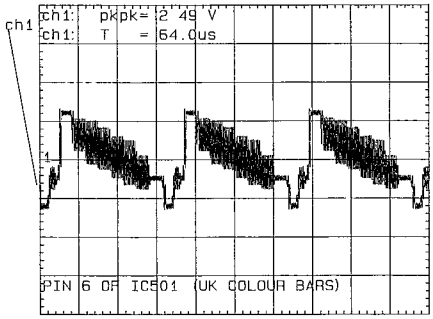




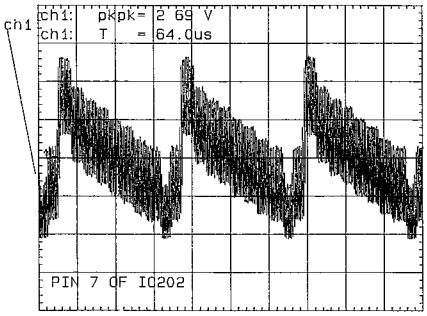




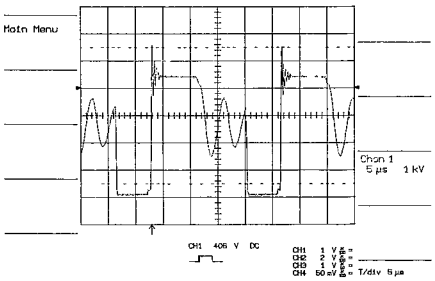
Pin 6 of IC501



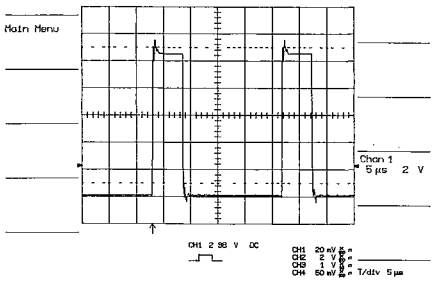
Pin 7 of IC202



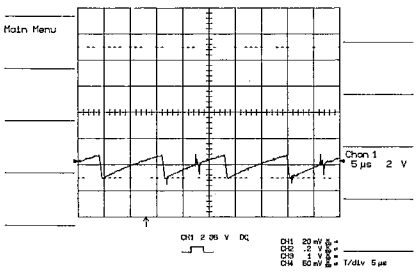
Q903 collector



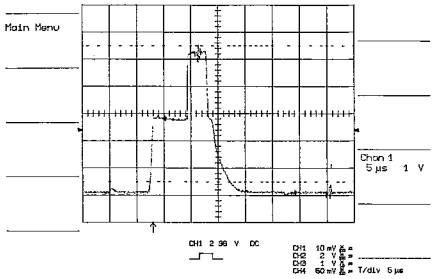
Q901 gate



IC900 Pin 4

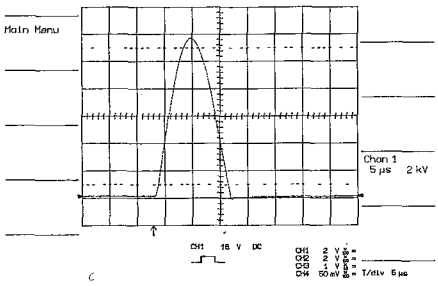


IC501 Pin 41

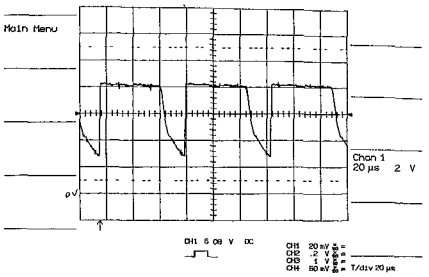


Q757 collector

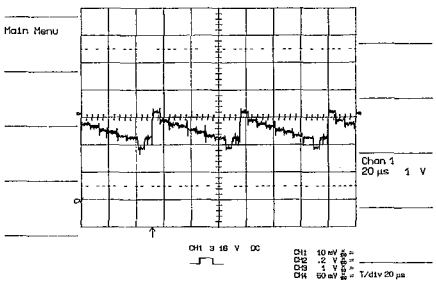
NO OR SLOW TRIGGER



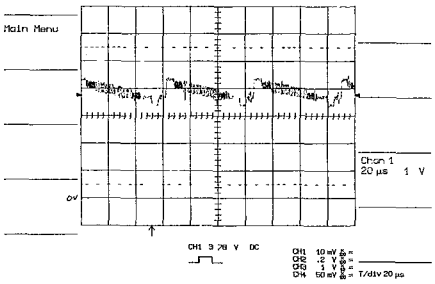
IC501 Pin 18



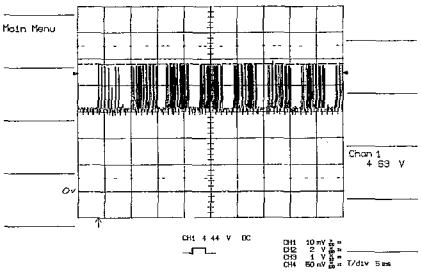
IC501 Pin 28



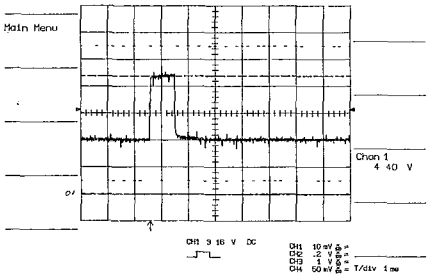
IC501 Pin 13

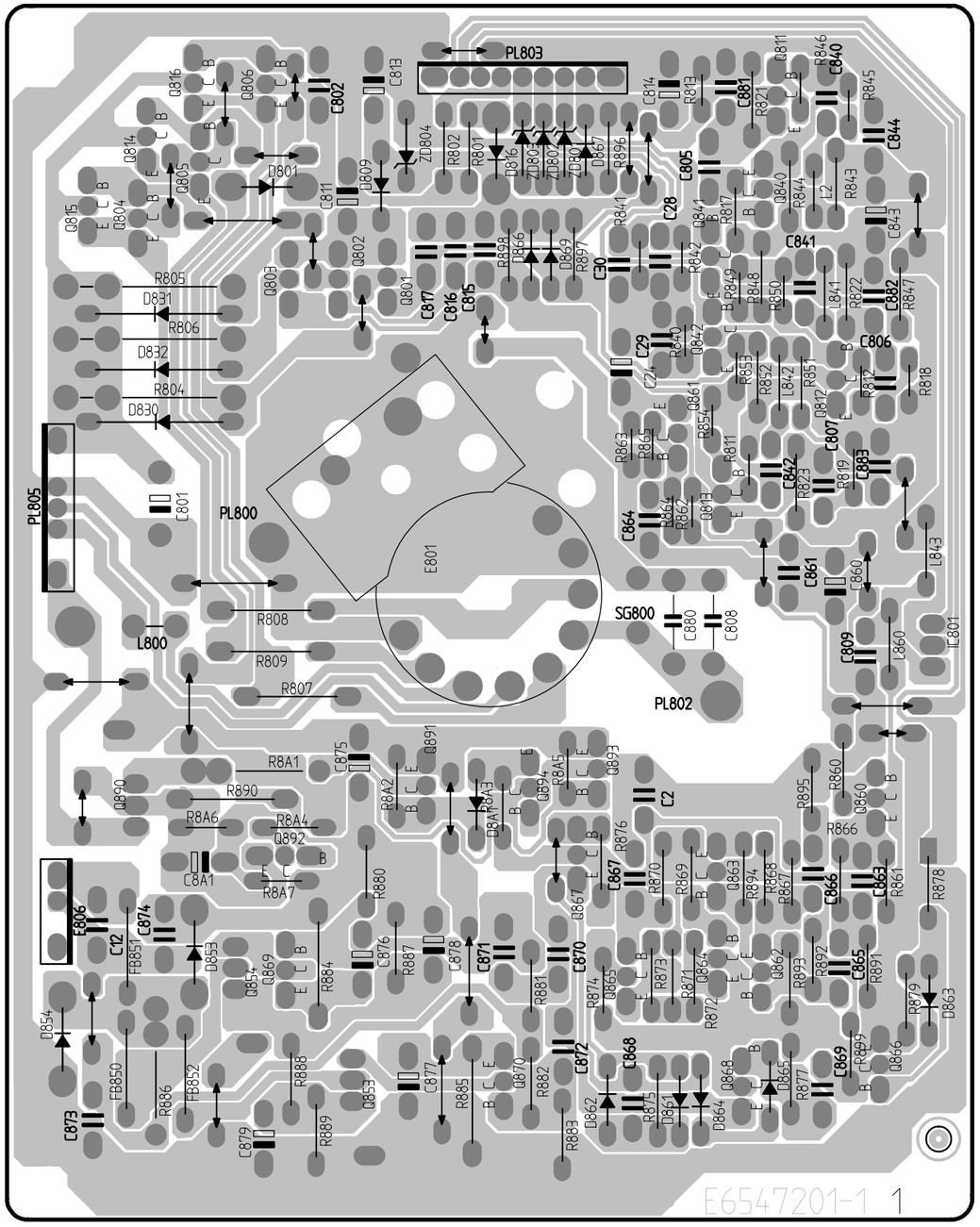


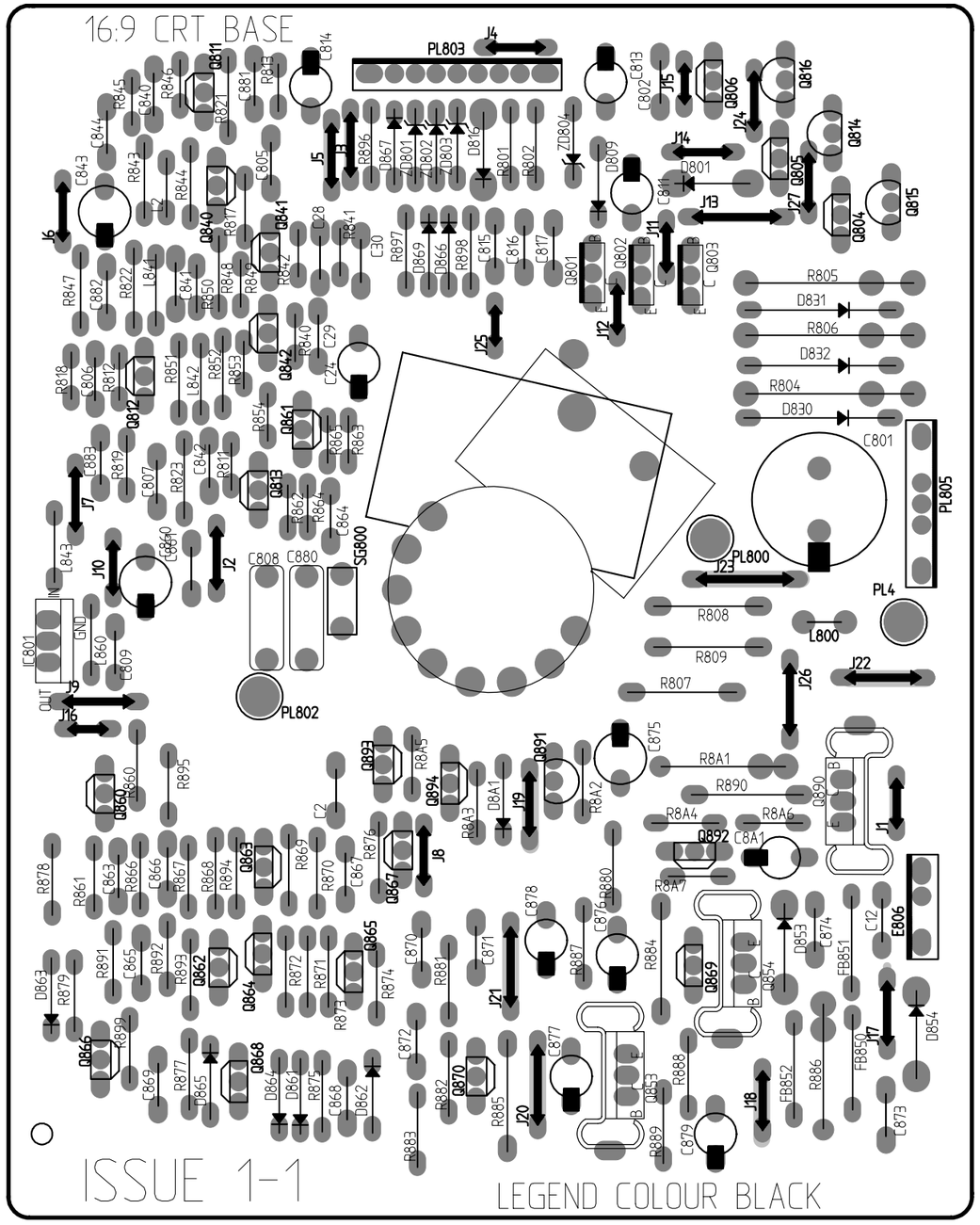
Represents text/O.S.D. levels at anodes of D001, D003 and D004

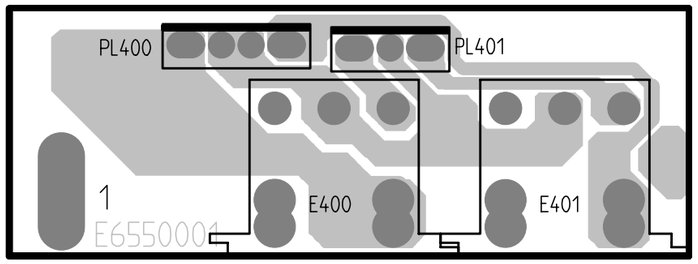


IC501 Pin 22

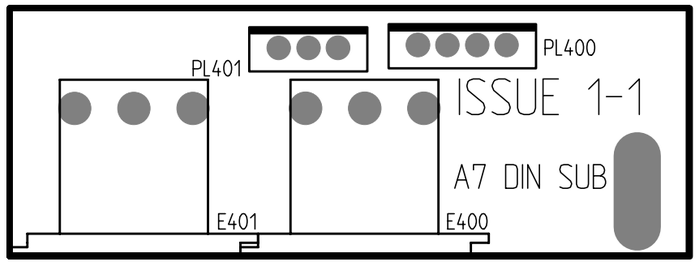



PL803
PL805
PL800
PL802
SG800
L800
E801
C801
C802
C805
C806
C807
C809
C811
C813
C814
C815
C816
C817
C841
C842
C843
C844
C860
C861
C863
C864
C880
C808
L843
L801
R805
R806
R804
R808
R809
R807
R8A1
R890
R8A6
R8A4
R8A7
R880
R884
R887
R888
R889
R886
R885
R883
R882
R881
R870
R871
R872
R873
R874
R876
R878
R879
R861
R860
R895
R866
R867
R868
R869
R894
R893
R892
R891
R865
R847
R848
R849
R850
R851
R852
R853
R854
R855
R856
R857
R858
R859
R862
R863
R864
R818
R819
R821
R822
R823
R896
R897
R898
R899
R8A2
R8A3
R8A5
D830
D831
D832
D801
D802
D803
D804
D805
D806
D807
D808
D809
D810
D811
D812
D813
D814
D815
D816
D817
D818
D819
D820
D821
D822
D823
D824
D825
D826
D827
D828
D829
D833
D834
D835
D836
D837
D838
D839
D840
D841
D842
D843
D844
D845
D846
D847
D848
D849
D850
D851
D852
D853
D854
D855
D856
D857
D858
D859
D860
D861
D862
D863
D864
D865
D866
D867
D868
D869
D870
D871
D872
D873
D874
D875
D876
D877
D878
D879
D880
D881
D882
D883
D884
D885
D886
D887
D888
D889
D890
D891
D892
D893
D894
D895
D896
D897
D898
D899
Q801
Q802
Q803
Q804
Q805
Q806
Q807
Q808
Q809
Q810
Q811
Q812
Q813
Q814
Q815
Q816
Q817
Q818
Q819
Q820
Q821
Q822
Q823
Q824
Q825
Q826
Q827
Q828
Q829
Q830
Q831
Q832
Q833
Q834
Q835
Q836
Q837
Q838
Q839
Q840
Q841
Q842
Q843
Q844
Q845
Q846
Q847
Q848
Q849
Q850
Q851
Q852
Q853
Q854
Q855
Q856
Q857
Q858
Q859
Q860
Q861
Q862
Q863
Q864
Q865
Q866
Q867
Q868
Q869
Q870
Q871
Q872
Q873
Q874
Q875
Q876
Q877
Q878
Q879
Q880
Q881
Q882
Q883
Q884
Q885
Q886
Q887
Q888
Q889
Q890
Q891
Q892
Q893
Q894
Q895
Q896
Q897
Q898
Q899
E6547201-1 1

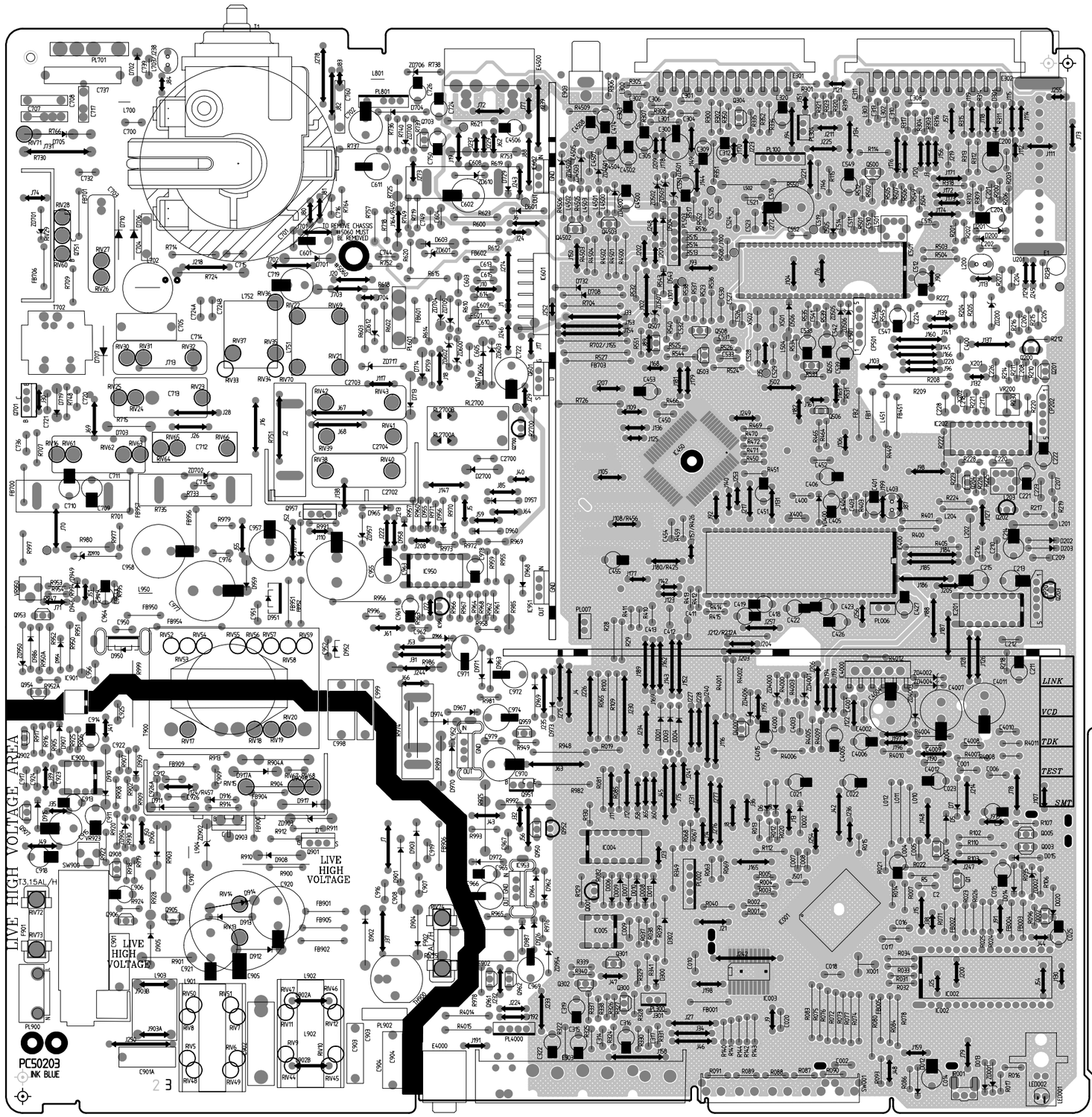

16:9 CRT BASE
PL803
PL805
PL800
PL802
PL4
SG800
L800
C801
J1
J2
J3
J4
J5
J6
J7
J8
J9
J10
J11
J12
J13
J14
J15
J16
J17
J18
J19
J20
J21
J22
J23
J24
J25
J26
J27
IC801
IN
GND
OUT
R805
R806
R804
R808
R809
R807
R8A1
R890
R8A4
R8A6
R8A7
R886
R885
R883
R882
R881
R870
R871
R872
R873
R874
R876
R878
R879
R861
R860
R895
R866
R867
R868
R869
R894
R893
R892
R891
R865
R847
R848
R849
R850
R851
R852
R853
R854
R855
R856
R857
R858
R859
R862
R863
R864
R818
R819
R821
R822
R823
R896
R897
R898
R899
R8A2
R8A3
R8A5
D830
D831
D832
D801
D802
D803
D804
D805
D806
D807
D808
D809
D810
D811
D812
D813
D814
D815
D816
D817
D818
D819
D820
D821
D822
D823
D824
D825
D826
D827
D828
D829
D833
D834
D835
D836
D837
D838
D839
D840
D841
D842
D843
D844
D845
D846
D847
D848
D849
D850
D851
D852
D853
D854
D855
D856
D857
D858
D859
D860
D861
D862
D863
D864
D865
D866
D867
D868
D869
D870
D871
D872
D873
D874
D875
D876
D877
D878
D879
D880
D881
D882
D883
D884
D885
D886
D887
D888
D889
D890
D891
D892
D893
D894
D895
D896
D897
D898
D899
Q801
Q802
Q803
Q804
Q805
Q806
Q807
Q808
Q809
Q810
Q811
Q812
Q813
Q814
Q815
Q816
Q817
Q818
Q819
Q820
Q821
Q822
Q823
Q824
Q825
Q826
Q827
Q828
Q829
Q830
Q831
Q832
Q833
Q834
Q835
Q836
Q837
Q838
Q839
Q840
Q841
Q842
Q843
Q844
Q845
Q846
Q847
Q848
Q849
Q850
Q851
Q852
Q853
Q854
Q855
Q856
Q857
Q858
Q859
Q860
Q861
Q862
Q863
Q864
Q865
Q866
Q867
Q868
Q869
Q870
Q871
Q872
Q873
Q874
Q875
Q876
Q877
Q878
Q879
Q880
Q881
Q882
Q883
Q884
Q885
Q886
Q887
Q888
Q889
Q890
Q891
Q892
Q893
Q894
Q895
Q896
Q897
Q898
Q899
ISSUE 1-1
LEGEND COLOUR BLACK



Solder Side

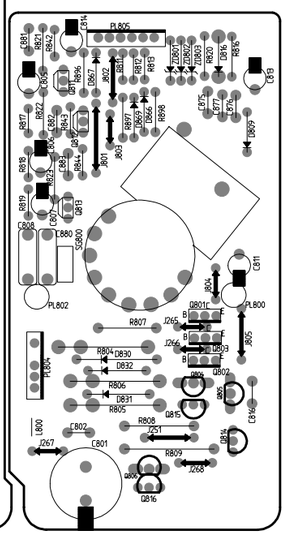


Component Side



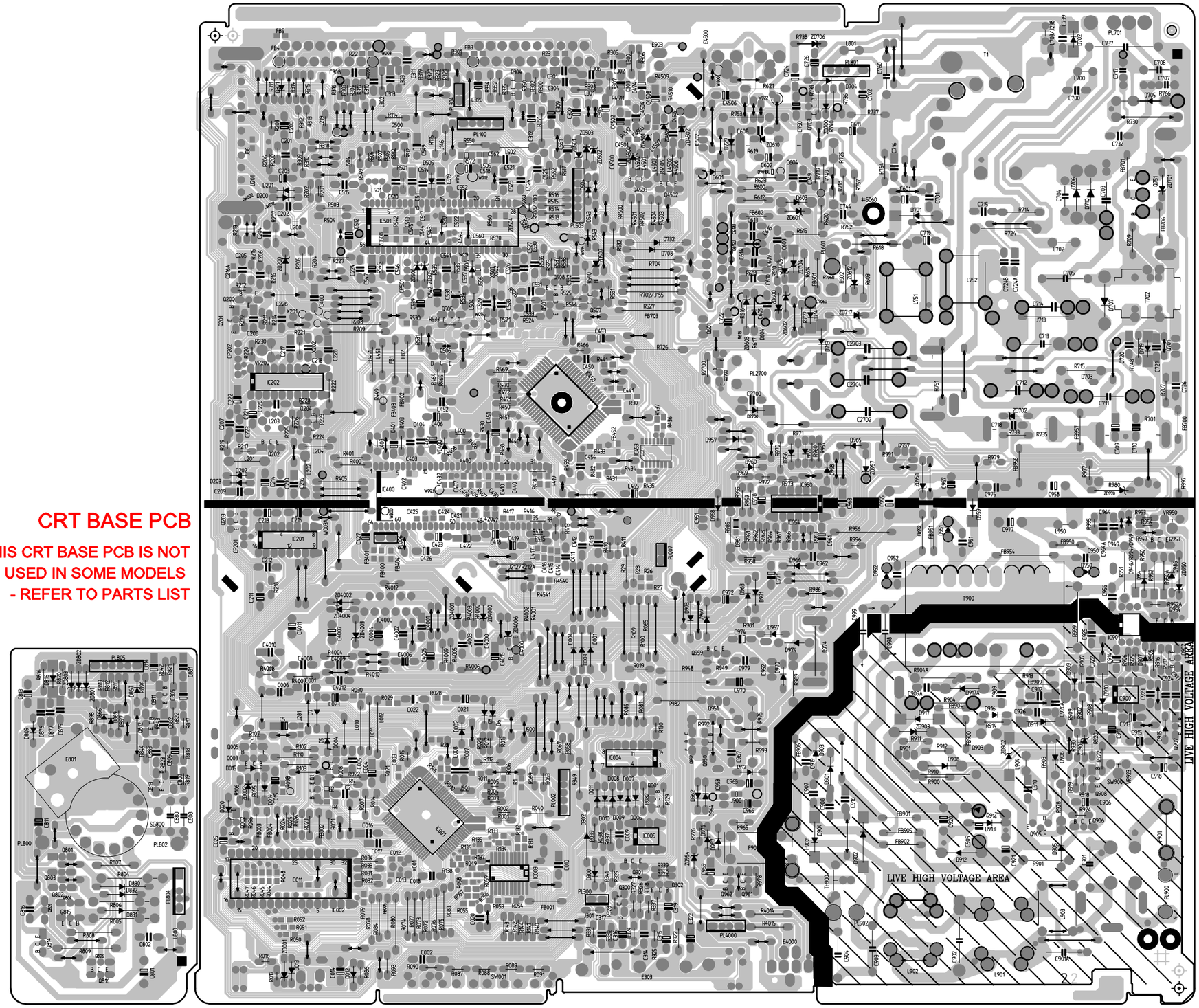
CRT BASE PCB

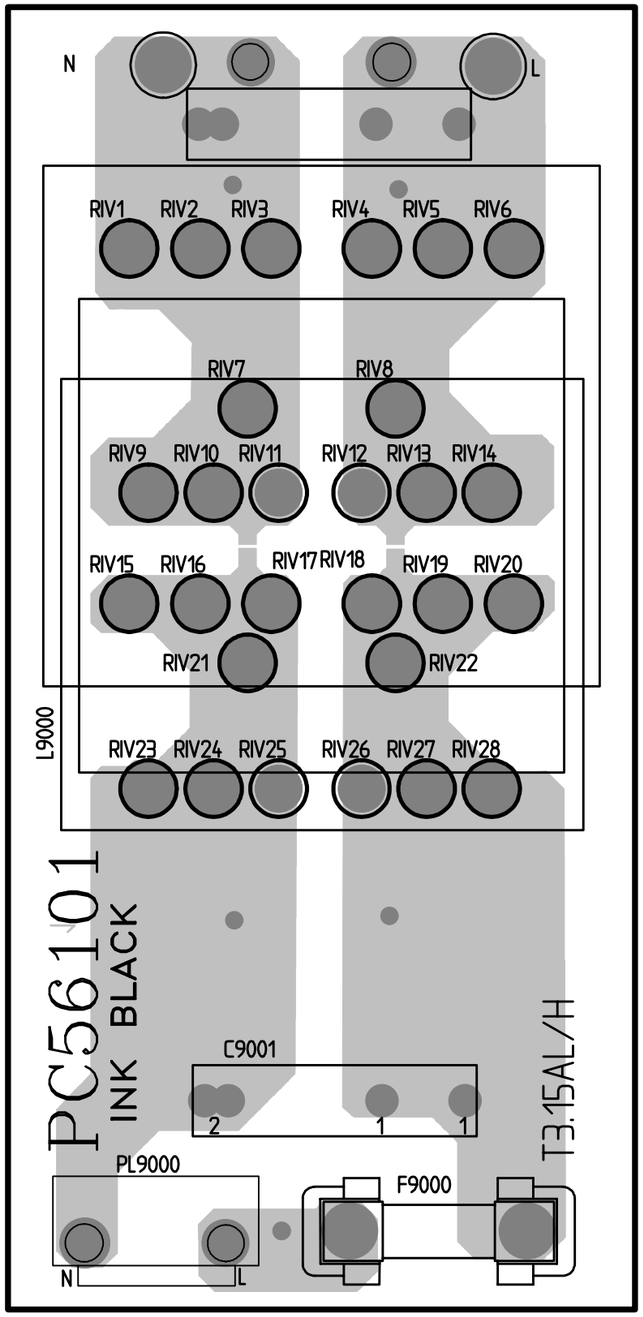
THIS CRT BASE PCB IS NOT USED IN SOME MODELS
- REFER TO PARTS LIST

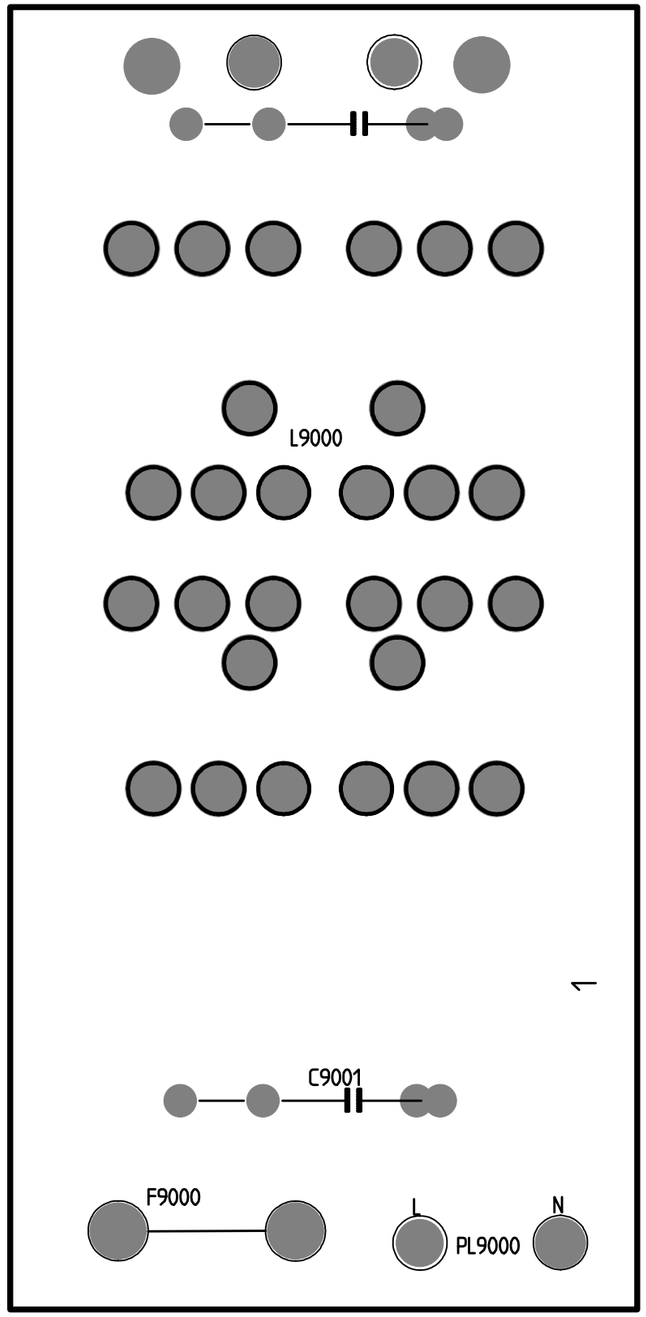


CRT BASE PCB

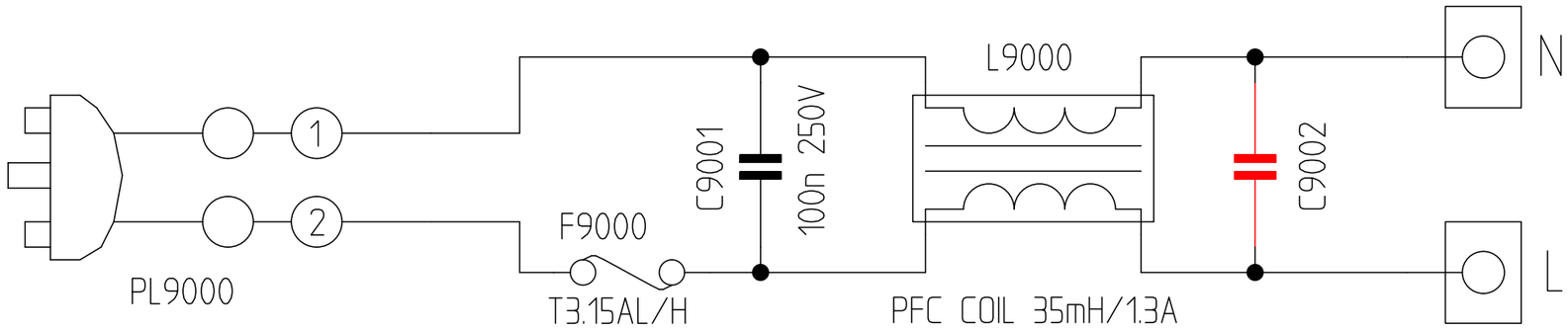
THIS CRT BASE PCB IS NOT
USED IN SOME MODELS
- REFER TO PARTS LIST

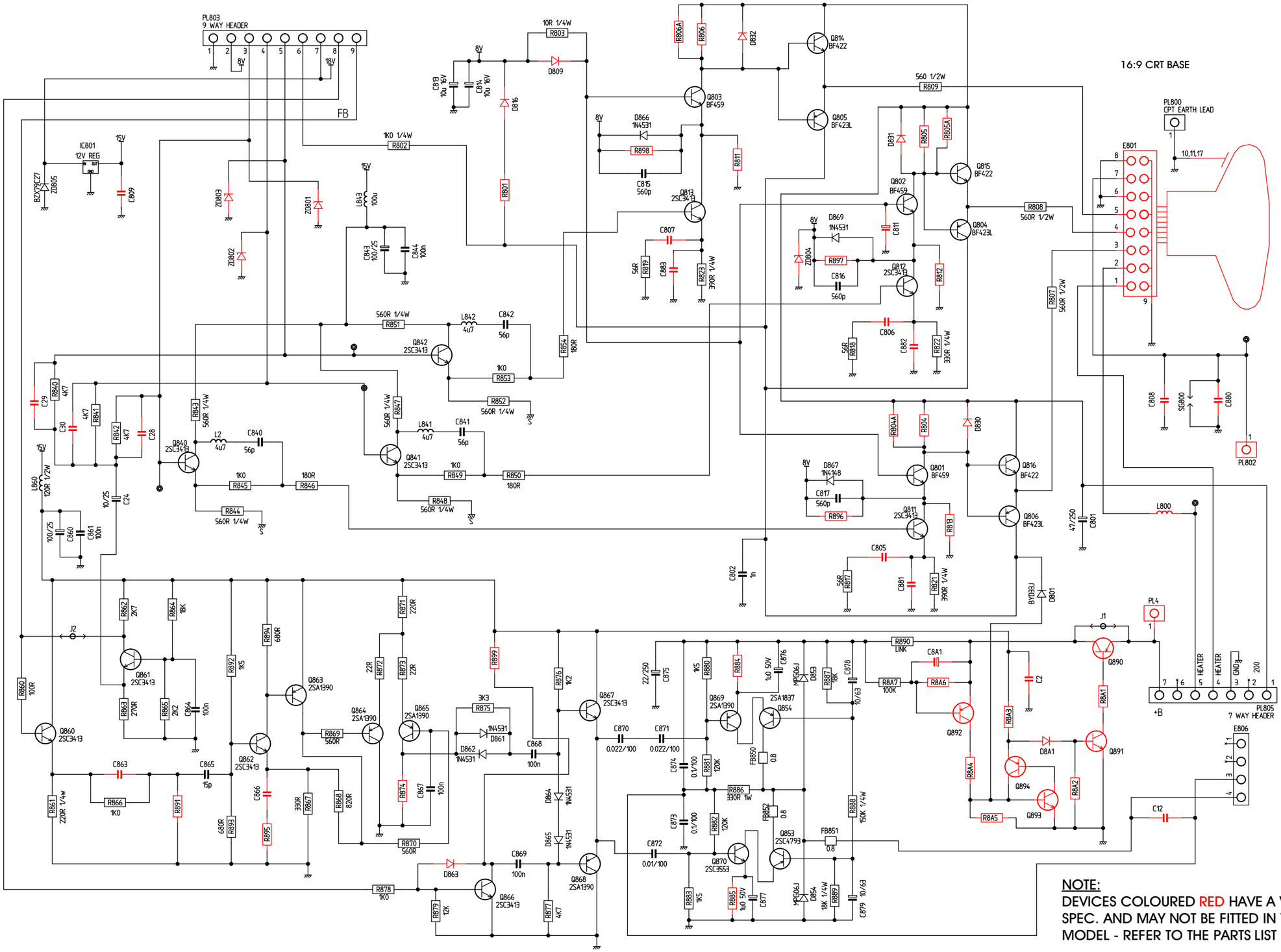



N
L
RIV1
RIV2
RIV3
RIV4
RIV5
RIV6
RIV7
RIV8
RIV9
RIV10
RIV11
RIV12
RIV13
RIV14
RIV15
RIV16
RIV17
RIV18
RIV19
RIV20
RIV21
RIV22
L9000
RIV23
RIV24
RIV25
RIV26
RIV27
RIV28
PC56101
INK BLACK
C9001
2
1
1
T3.15AL/H
PL9000
F9000
N
L

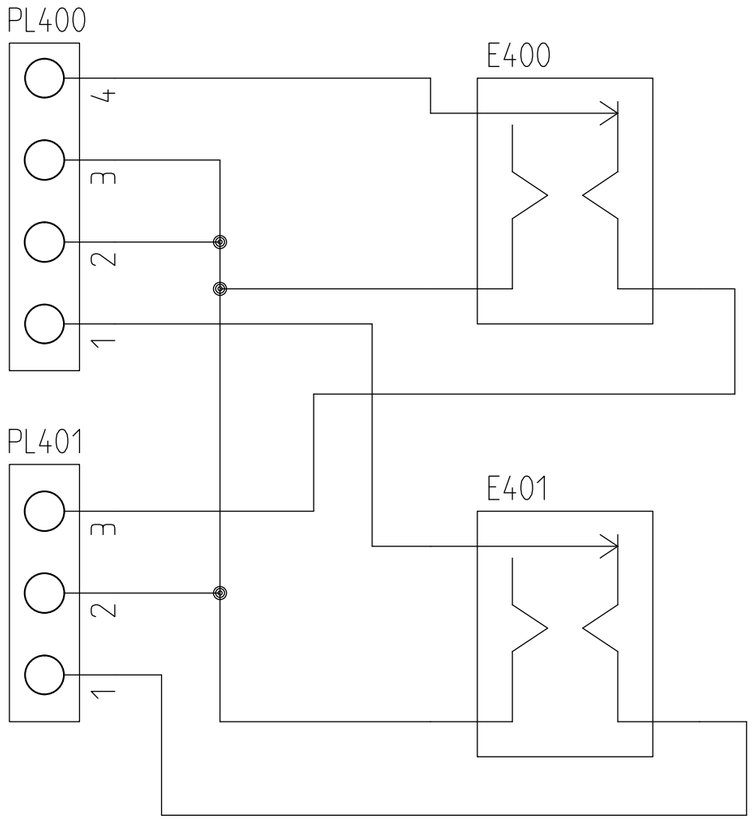

L9000
1
C9001
F9000
L
N
PL9000

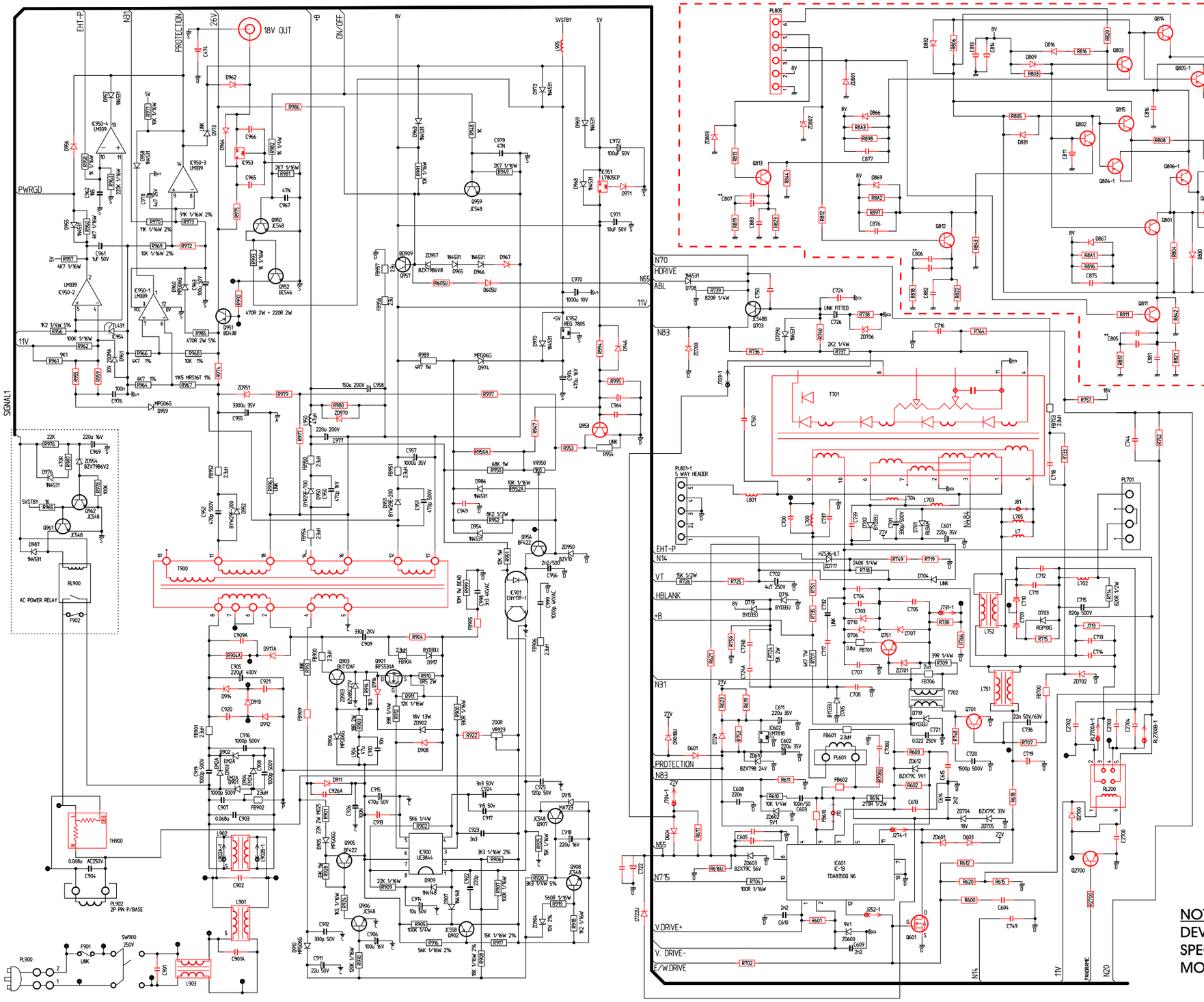
NOTE:
DEVICES COLOURED RED HAVE A VARIABLE SPEC. AND MAY NOT BE FITTED IN THIS MODEL - REFER TO THE PARTS LIST



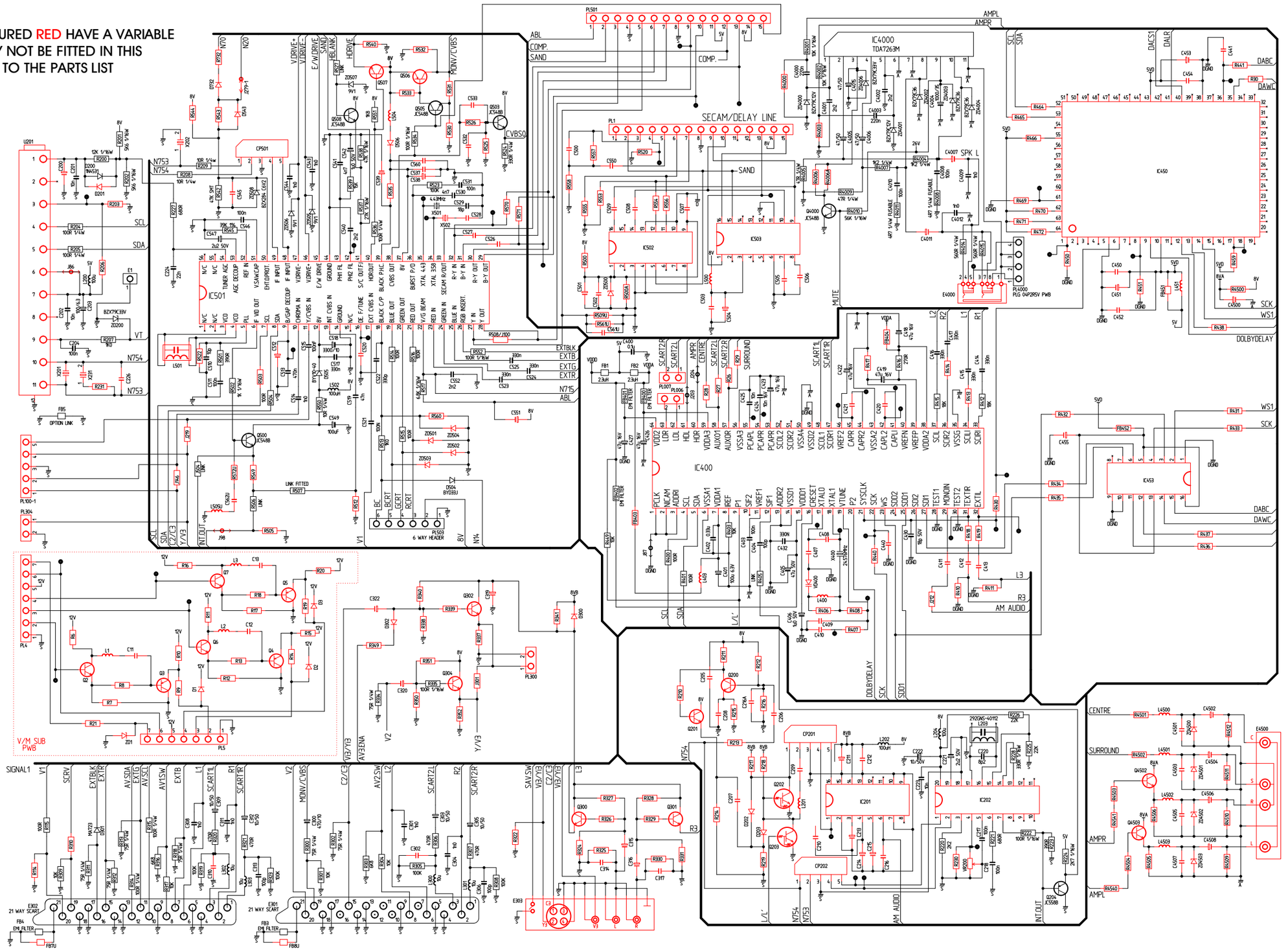


SM 00030	A7 16:9 CRT BASE CIRCUIT	HITACHI

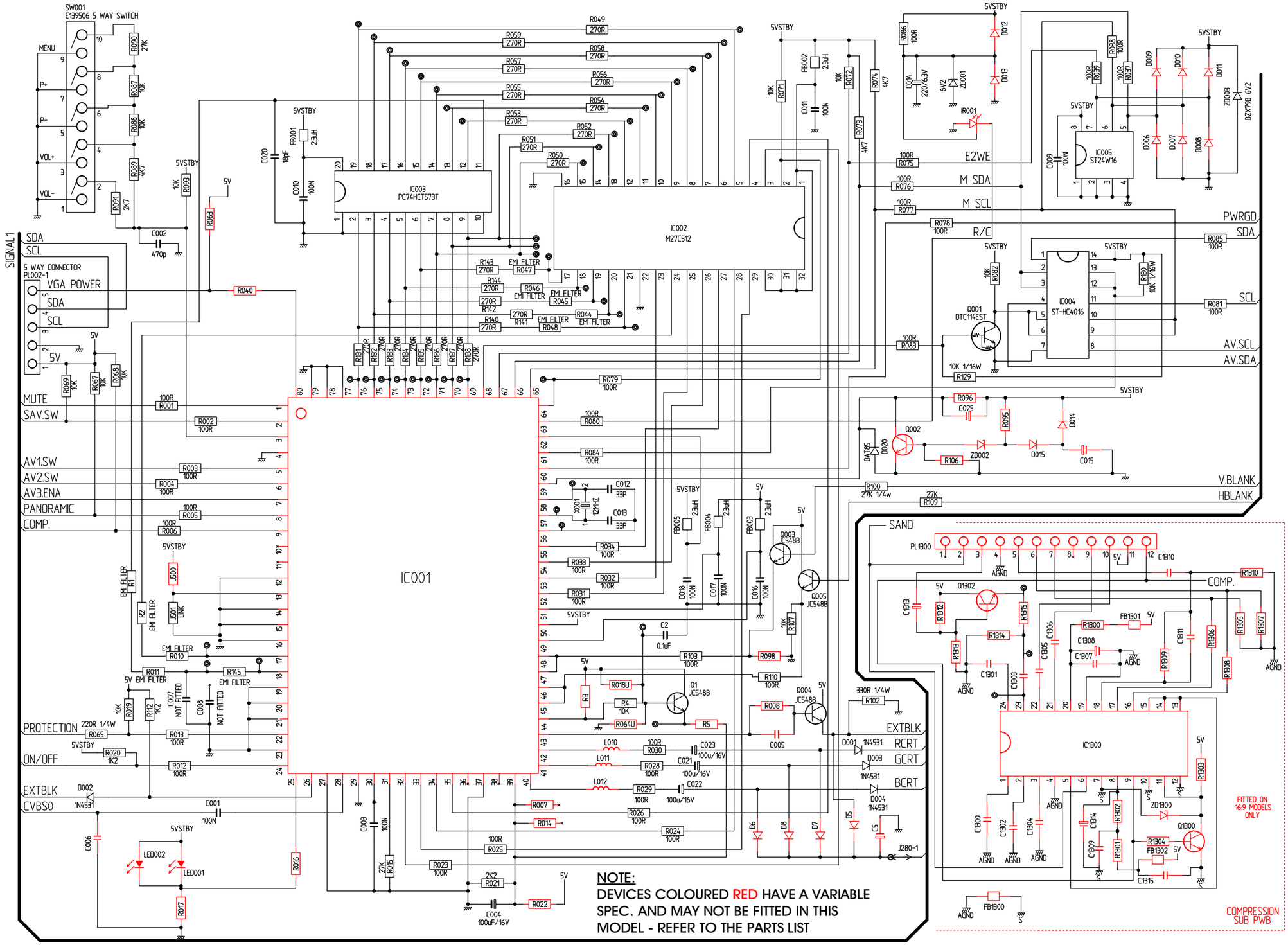

PL400
4
3
2
1
E400
PL401
3
2
1
E401


CRT BASE
NOTE:
THIS CRT BASE CIRCUIT IS NOT FITTED IN SOME MODELS - REFER TO PARTS LIST
** WHEN FITTED THIS COMPONENT WILL BE AN ECAP EXCEPT ON 32" MODELS WHERE A NORMAL CAP IS FITTED
NOTE:
DEVICES COLOURED RED HAVE A VARIABLE SPEC. AND MAY NOT BE FITTED IN THIS MODEL - REFER TO THE PARTS LIST
18V OUT
PROTECTION
ON/OFF
PWRGD
SIGNAL1
EHT-P
HDRIVE
ABL
HBLANK
VT
V.DRIVE+
V. DRIVE-
E/W.DRIVE
AC POWER RELAY
PL902 2P PIN P/BASE
PL802
PL804-1
PL805
PL800
PL701
PL801-1 5 WAY HEADER
IC950-1 LM339
IC950-2 LM339
IC950-3 LM339
IC952 REG 7805
IC601 E-S TDA8350Q N6
IC900 UC3844
IC901 OVTTF-1
T900
T701
T702
T751
T752
T731-1
L751
L752
L801
L902
L903
L901
TH900
RL900
F902
F901
SW900
Q951 BDA38
Q952 BC546
Q953
Q954 BF422
Q957 BD909
Q959 JC548
Q962 JC548
Q963 BUT12AF
Q964 BUK456-200A
Q965 BUK456-200A
Q966 BUK456-200A
Q967 BUK456-200A
Q968 BUK456-200A
Q969 BUK456-200A
Q701
Q751
Q801
Q802
Q803
Q804-1
Q805-1
Q806-1
Q811
Q812
Q813
Q814
Q815
Q816
Q2700
Q601
E801
N70
N55
N83
N715
N14
N31
11V
5V
5VSTBY
8V
22V
N20
PANDRAME

NOTE:
DEVICES COLOURED RED HAVE A VARIABLE SPEC. AND MAY NOT BE FITTED IN THIS MODEL - REFER TO THE PARTS LIST



SM 00030	A7 MAIN BOARD (SIGNAL CIRCUIT)	HITACHI



SM 00030	A7 MAIN BOARD (MICRO CIRCUIT)	HITACHI

THE UPDATED PARTS LIST

FOR THIS MODEL IS

AVAILABLE ON ESTA

HITACHI

Hitachi, Ltd. Tokyo, Japan
International Sales Division
THE HITACHI ATAGO BUILDING,
No. 15 –12 Nishi Shinbashi, 2 – Chome,
Minato – Ku, Tokyo 105-8430, Japan.
Tel: 03 35022111

HITACHI EUROPE LTD,
Whitebrook Park
Lower Cookham Road
Maidenhead
Berkshire
SL6 8YA
UNITED KINGDOM
Tel: 01628 643000
Fax: 01628 643400
Email: **consumer-service@hitachi-eu.com**

HITACHI EUROPE S.A.
364 Kifissias Ave. & 1, Delfon Str.
152 33 Chalandri
Athens
GREECE
Tel: 1-6837200
Fax: 1-6835964
Email: **service.hellas@hitachi-eu.com**

HITACHI EUROPE GmbH
Munich Office
Dornacher Strasse 3
D-85622 Feldkirchen bei München
GERMANY
Tel: +49-89-991 80-0
Fax: +49-89-991 80-224
Hotline: +49-180-551 25 51 (12ct/min)
Email: **HSE-DUS.service@hitachi-eu.com**

HITACHI EUROPE S.A.
Gran Via Carlos III, 101-1
08028 Barcelona
SPAIN
Tel: 93 409 2550
Fax: 93 491 3513
Email: **atencion.cliente@hitachi-eu.com**

HITACHI EUROPE srl
Via Tommaso Gulli N.39, 20147
Milano, Italia
ITALY
Tel: +39 02 487861
Tel: +39 02 38073415 Servizio Clienti
Fax: +39 02 48786381/2
Email: customerservice.italy@hitachi-eu.com

HITACHI Europe AB
Box 77 S-164 94 Kista
SWEDEN
Tel: +46 (0) 8 562 711 00
Fax: +46 (0) 8 562 711 13
Email: **csgswe@hitachi-eu.com**

HITACHI EUROPE S.A.S
Lyon Office
B.P. 45, 69671 BRON CEDEX
FRANCE
Tel: 04 72 14 29 70
Fax: 04 72 14 29 99
Email: **france.consommateur@hitachi-eu.com**

HITACHI EUROPE LTD (Norway) AB
STRANDVEIEN 18
1366 Lysaker
NORWAY
Tel: 67 5190 30
Fax: 67 5190 32
Email: **csgnor@hitachi-eu.com**

HITACH EUROPE AB
Egebækgård
Egebækvej 98
DK-2850 Nærum
DENMARK
Tel: +45 43 43 6050
Fax: +45 43 60 51
Email: **csgnor@hitachi-eu.com**

HITACHI EUROPE AB
Neopoli / Niemenkatu 73
FIN-15140 Lahti
FINLAND
Tel : +358 3 8858 271
Fax: +358 3 8858 272
Email: **csgnor@hitachi-eu.com**

Hitachi Europe Ltd
Bergensesteenweg 421
1600 Sint-Pieters-Leeuw
BELGIUM
Tel: +32 2 363 99 01
Fax: +32 2 363 99 00
Email: **sofie.van.bom@hitachi-eu.com**

HITACHI EUROPE LTD
Na Sychrove 975/8
101 27 Praha 10 – Bohdalec
CZECH REPUBLIC
Tel: +420 267 212 383
Fax: +420 267 212 385
Email: **csgnor@hitachi-eu.com**

www.hitachidigitalmedia.com